

THE WEATHERIZATION ASSISTANCE PROGRAM AND OTHER ENERGY CONSERVATION EFFORTS IN KENTUCKY



prepared for the

**Program Review and Investigations Committee
of the
Legislative Research Commission
Commonwealth of Kentucky**

by

The Pendragon Group

April 1989

Research Report No. 248

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FOREWORD AND ACKNOWLEDGMENTS

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Whatever mistakes might appear in this document are our own. We received excellent cooperation from program administrators at all levels, but they are not responsible for any errors this report may contain.

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GLOSSARY

CHR	Kentucky Cabinet for Human Resources
DES	Department for Employment Services, Cabinet for Human Resources
DOE	U.S. Department of Energy
DSI	Department of Social Insurance, Cabinet for Human Resources
EES	Energy Extension Service
ERA	Economic Regulatory Administration, DOE
GEER	Grants to the Elderly for Energy Repairs
HEAP	Home Energy Assistance Program, the state name for LIHEAP
HHS	U.S. Department of Health and Human Services
HUD	U.S. Department of Housing and Urban Development
ICP	Institutional Conservation Service
KECP	Kentucky Energy Conservation Program, the state name for SECP
KEES	Kentucky Energy Extension Service, the state name for EES
KESF	Kentucky Energy Savers Fund, the state name for the HUD Solar and Energy Conservation Bank
KHC	Kentucky Housing Corporation
LIHEAP	Low-Income Home Energy Assistance Program
LRC	Kentucky Legislative Research Commission
OHA	Office of Hearings and Appeals, DOE
OSLAP	Office of State and Local Assistance Programs, DOE
PILIRR	Partners in Low-Income Residential Retrofit, a one-time DOE-funded pilot that later became SWAT-01, and was included in the KECP
PORF	Petroleum Overcharge Restitution Fund, an earlier name for Petroleum Violation Escrow

PSC	Kentucky Public Service Commission
PVE	Petroleum Violation Escrow, the format name for the oil overcharge funds
SECP	State Energy Conservation Program, the national name for KESF
SEO	State Energy Office, a nation-wide generic term for those state agencies which administer SECP, EES, ICP, and sometimes WAP
SWAT	Seniors Weatherization Assistance and Training
SWAT-JR	Student Weatherization and Audit Training
TVA	Tennessee Valley Authority
WAP	Weatherization Assistance Program

EXECUTIVE SUMMARY

This study analyzes the effectiveness of energy conservation programs in Kentucky -- particularly the Weatherization Assistance Program (WAP). It also looks at coordination between WAP and the Low-Income Home Energy Assistance Program (LIHEAP). It is based on extensive state interviews, on-site visits to 12 WAP subgrantees, and surveys of all WAP subgrantees.

We offer a number of findings and recommendations. Regarding the WAP program, we were very impressed with administrative improvements and the quality of workmanship (meaning building trades techniques) on the houses and mobile homes which we observed. Regarding the other state-sponsored conservation programs, we were equally impressed by the dedication and hard work of the state program managers, and by their ability to stretch limited dollars into worthwhile conservation initiatives.

We also found that WAP subgrantees lack adequate diagnostic technology and training, and that a number of current administrative and policy decisions hamper their programs. Kentucky has failed to take advantage of well-demonstrated advances in diagnostic technology; as a result, subgrantees are wedded to a "doors and windows" approach that diverts resources from more effective (and often less expensive) improvements.

The most carefully designed studies of WAP, nationally and in other states, have reported savings in the 10-20 percent range. Savings tend to be most strongly correlated with a combination of measures that include attic and sidewall insulation in addition to general infiltration reduction. Average savings for mobile homes using techniques roughly comparable to those used in Kentucky tend to be about half the magnitude of those for houses. Based on what we know about the Kentucky program, we would expect overall savings to cluster near the lower end of the range reported in the best-designed studies -- or perhaps below it, partly because of the number of mobile homes weatherized but also because of a tendency to put most materials money into windows and doors at the expense of attic and sidewall insulation.

We urge that Kentucky move to a performance-based program that emphasizes verifiable energy savings. Our specific findings are detailed in Sections 3 and 4, with recommendations in Section 5. Briefly, they are as follows:

Recommendation 1 -- Funding Allocations: The legislature should reconsider the current funding formulas of the oil overcharge (PVE) funds relating to LIHEAP, WAP, and the conservation programs administered by KEC, as established in KRS 42.560-564. At the very minimum, we suggest that the initial ratio between WAP and LIHEAP be reversed, i.e., changed to 60 percent for WAP, 40 percent for LIHEAP. We also support additional funds for other energy conservation programs, notably those sponsored by the Kentucky Energy Cabinet.

Recommendation 2 -- Diagnostic Technology: WAP administrators should redirect the current focus of the weatherization operations to emphasize verifiable energy savings, as indicated by modern diagnostic technology, particularly blower doors. This will require reevaluation and partial rewrite of The Home Heating Audit and modification of Project Retro-Tech, to be approved by the federal Department of Energy, as referenced in Title 10 CFR Part 440.14 (b)(5) and 440.21 (f).

Recommendation 3 -- Selection of Measures: DES administrators should require that weatherization measures be based on air changes per hour and develop target reductions for various dwelling units. These targets should replace the current dollar targets now in use. This will require a re-write of WX-3, the Weatherization Survey Sheet. DES administrators should also place increased focus on blowing cellulose into walls and on improvements in furnace efficiency.

Recommendation 4 -- Monitoring and Evaluation: As WAP moves into a performance-based operational mode, DES state monitors should be equipped with blower doors and use them as part of their routine monitoring work. Once the performance-based system is at least partially operational, DES should conduct an independent review to compare before-and-after savings for WAP and non-WAP clients, and for WAP clients served by a performance-based system as compared with those served using current practices.

Recommendation 5 -- Training Improvements: DES should equip a state-level training program with one high-quality infrared scanner and video display. Trainers should be adequately equipped in and fully conversant with new technological aids in weatherization diagnostics. Further, there should be more frequent hands-on training at the local level -- and perhaps at the job site -- rather than is currently the case. Because of the prevalence of mobile homes in rural areas, special emphasis should be given to training in weatherizing them.

Recommendation 6 -- The 40 Percent for Materials: Once DES has succeeded in establishing workable performance-based standards, it should relax the "40 percent for materials" rule by excluding LIHEAP and oil overcharge funds from its coverage.

Recommendation 7 -- The "Fairness" Doctrine: DES should actively discourage the current notion among subgrantees that "fairness" means that every eligible client is entitled to have the approximately the same amount of money spent on his or her house as every other client, and that this should be as close to the allowable \$1600 limit as possible. An important part of the strategy should be publicity that program targets will be expressed in terms of desired results, not levels of expenditure.

Recommendation 8 -- The 15 Percent Ceiling on Rental Units: The DES should invite an independent review of the impact on low-income rental households of the 15 percent ceiling on rental units weatherized. If appropriate, the Department should reevaluate its policy regarding rental properties.

Recommendation 9 -- Selection Criteria: DES administrators should reevaluate the overwhelmingly high priority given to elderly and handicapped, and consider other factors in the point system used for selecting among WAP applicants. Although regulation Title 10 CFR Part 440.16 (b) identifies "high energy consuming dwelling units" among the priority categories, form WX-1 gives so few points to this category as to make it virtually meaningless.

Recommendation 10 -- Encouraging Innovation in Weatherization Programs: DES/DSI administrators should work together to develop a review process to encourage innovative approaches to weatherization. A sizable portion of the LIHEAP 15 percent transfer should be directed to innovative efforts.

Recommendation 11 -- Coordination with Other Programs: Pursuant to Title 10 CFR Part 440.16(e), DES should develop policies to include specific language encouraging coordination with other programs, and spelling out what that coordination might be. DES should provide financial assistance to one or two pilot programs that include private-sector resources as an integral component of WAP services.

Recommendation 12 -- Overall Policy for Statewide Initiatives: The role of the Division of Conservation, specifically, and of the Kentucky Energy Cabinet, generally, as currently defined in KRS Chapter 152A, should be reexamined by the Administration and the General Assembly. One centralized clearinghouse for innovative technologies in conservation, and one coordinated policy for spurring innovation among all sectors is needed. Adequate PVE funding, as currently allocated in Senate Bill 10, should be upwardly revised to allow the Division of Conservation to carry out this statewide coordination and innovation function. The establishment of a broad-based coordinating committee to develop statewide conservation policies is also recommended.

In summary, we recommend allocating discretionary resources to conservation to the maximum extent feasible. Energy conservation, while it may serve fewer individuals than energy assistance, is better both for those individuals and for the state as a whole. It is appropriate to help pay the bills of families facing immediate needs, but those needs tend to recur year after year. In this respect, energy-related welfare programs are like other welfare programs. Properly installed conservation measures at least offer hope of breaking a cycle of dependency on public subsidies. In addition to energy conservation, a collateral benefit of increasing support for WAP is the multiplier effect of job creation.

The Kentucky Legislature's original legislation that called for a perpetual trust fund for WAP appeared to be a creative strategy. When the decision was made to limit its "perpetuity" to ten years or less, the 60-40 split in favor of LIHEAP was introduced. The reasons for this decision are unknown to us. Whatever the rationale, our recommendation is that the initial ratio between WAP and LIHEAP be reversed, i.e., changed to 60 percent for WAP, 40 percent for LIHEAP. We also support additional funds for other energy conservation programs, notably those sponsored by KEC.

The opportunities in energy conservation, which affect all sectors of the state, greatly exceed the current staff capabilities and funding. KEC's role as a statewide coordinating/long-term planning function should be enhanced; we suggest that KEC be the focal point for state energy conservation planning, and research and development (R&D) activities.

We recommend that a standing Energy Conservation Coordinating Committee be established to develop long-term energy policies and also ensure that all agencies involved in energy conservation issues are informed of developments in other states. It might also review proposals for pilot projects. The committee should include representatives from DES, DSI, KHC, the PSC, the Legislature, local governments, fuel suppliers, universities, and appropriate community groups, but it should be staffed by the KEC. We would like to see the KEC become a clearinghouse for technical innovations, with a mission to disseminate that information as widely as possible to state and local agencies, community groups, utilities, and universities.

Our main points may be summarized as follows:

- (1) In the energy area, as in others, helping people keep their bills low makes more sense than paying their bills for them. Therefore, to the maximum extent feasible, the state should promote conservation over welfare.
- (2) If, however, actual WAP savings in Kentucky are to reach their theoretical potential, the program must move toward performance-based standards measured with the help of weatherization diagnostic technology.
- (3) WAP is currently the most important energy conservation program in Kentucky and merits increased support, but it is not the only one. The state could do much more to take advantage of conservation approaches in other areas.

SECTION 1

PURPOSE OF THIS REPORT

The research for this report has been conducted under the direction of the Kentucky Legislative Research Commission (LRC). Its purpose is to evaluate the approach, effectiveness, and efficiency of the state's energy conservation and related programs, primarily those dealing with the weatherization of low-income residences.

1.1 Legislative History

Since 1982, the Interim Joint Committee on Energy has had oversight responsibilities for the federal Low-Income Home Energy Assistance Program (LIHEAP), known at the state level as the Home Energy Assistance Program (HEAP).¹ Although LIHEAP is explicitly not an energy conservation program, up to 15 percent of the total LIHEAP grant can be used for the Weatherization Assistance Program (WAP), which is designed to improve the energy efficiency of low-income residences. In its oversight role for LIHEAP, the Committee has also reviewed WAP activities.

During the 1984 interim session, a subcommittee of the Joint Committee prefiled a bill to set up a task force to look at the energy programs serving low-income users in the state. This bill passed in the 1986 session, and a Low-Income Energy Assistance Task Force was established to conduct research, including public hearings, on LIHEAP, WAP, and a number of smaller, but related programs.²

At approximately the same time, Senate Bill 325 was introduced by Senator Ed O'Daniel, a member of the Appropriations and Revenue Committee. It looked at the \$27 million that had been given to the state in the form of Petroleum Violation Escrow (PVE) funds³, and established a "perpetual trust fund," in which

¹ Throughout this report, with one exception, we will refer to each program by its state name, unless we are making a distinction between federal requirements common to all states, in which case, we will use the federal name. The exception is HEAP/LIHEAP, since it is commonly referred to as LIHEAP, even though HEAP is the correct acronym for the state name. Thus, we use LIHEAP throughout.

² Complete descriptions of the programs can be found in Appendix A.

³ These are better known as "oil overcharge" funds, and include the awards from the Exxon and Stripper Well Settlements, the two largest cases. See Appendix B for a brief history and allowable uses of the funds.

the principal would remain intact, while the interest would be used to support WAP. The bill passed overwhelmingly, and was signed into law on April 3, 1986.

During the year between sessions, the Task Force conducted public hearings, and the state developed plans for a perpetual trust fund. The Task Force heard more about WAP than they had anticipated and apparently realized that far more research was needed on the issue. One of their first acts when the Legislature reconvened in 1988 was to pass Senate Concurrent Resolution No. 1. That resolution required the Program Review and Investigations Committee to conduct a detailed study of the state's energy conservation and weatherization programs. As stated in the resolution, the study should include, but not be limited to:

- (1) An evaluation of both program and cost effectiveness of all state-administered energy conservation and weatherization programs and a comparative analysis of other selected states' programs;
- (2) Identification of private energy conservation and weatherization programs which could be successfully duplicated on a state level or coordinated with existing state programs;
- (3) Consideration of consolidation of some or all state energy conservation and weatherization programs;
- (4) Recommendations on how the state's Weatherization Assistance Program could be better coordinated with the Low-Income Home Energy Assistance Program; and
- (5) Recommendations on what the future focus of the state's energy conservation and weatherization programs should be and how these programs could be made more cost effective, provide more services, leverage more dollars, and better target program clientele.

The Resolution authorized the Program Review and Investigation Committee, with the approval of the Legislative Research Commission, to hire an independent consultant or consultants to assist in the evaluation of the various programs.

The year following the 1986 passage of the trust fund found major road-blocks in the approval of the trust fund. The U.S. Department of Energy (DOE), which ruled on state's proposed uses of the PVE funds, had indicated that the perpetual trust fund did not appear to be an "appropriate device" for restitution. After nearly a year of disputation with DOE, the state appealed the decision to the U.S. District Court, which had ruled on the Exxon settlement, one of the two major PVE cases. Anticipating a possible court ruling that would disallow its proposed perpetual trust fund for weatherization activities, the Legislature adopted an amended plan which would spend the total Exxon and Stripper Well funds over ten years or less, thus addressing concerns about the "permanent" trust fund. The plan provides eight percent or \$500,000 (whichever is greater) for the Institutional Conservation Program (ICP, better known as the "Schools and Hospitals" Program). The remainder was divided, with 60 percent going to LIHEAP and 40 percent going to WAP.

In summary, two quite separate legislative initiatives -- one the perpetual trust fund and the other an evaluation of state conservation initiatives -- both became topics for discussion in the 1988 session. Concerning the first, a decision on the trust fund has been made, and the fund is now operational; regarding the second, this report is intended to contribute to policy discussions on energy conservation strategies.

1.2 Activities Proposed by the LRC

Acting upon the mandate of the Task Force and the Senate Concurrent Resolution 1, the Legislative Research Commission (LRC) developed a Request for Proposals (RFP) and invited independent contractors to apply. Briefly stated, tasks specified in the RFP were as follows:

- (1) List, describe and explain the state-administered weatherization and energy conservation programs;
- (2) Evaluate the state-administered weatherization and energy conservation programs and their cost and program effectiveness;
- (3) Determine if there are privately operated programs in the state that could be duplicated or coordinated with existing state programs to improve effectiveness or reduce cost;
- (4) Determine how WAP and LIHEAP can be better coordinated or consolidated; and,
- (5) Determine what the future focus of the State's energy conservation and weatherization program should be.

In October 1988, The Pendragon Group, an independent contractor, was selected to conduct the study. We examined the weatherization and energy conservation programs, while the LRC staff conducted an analysis of the LIHEAP program. The conclusions of the LRC evaluation are being presented independently of this report.

1.3 The Focus of This Report

As requested by the LRC and instructed by the Senate resolution, this report is designed to provide legislators and policymakers with an independent assessment of Kentucky's energy conservation programs. It looks primarily at WAP, but examines all conservation programs in some detail. Selected private-sector initiatives are also described. LIHEAP is mentioned repeatedly, particularly in its interaction with WAP, but it is not specifically addressed, since it is not a conservation measure.

This report contains a series of observations and recommendations based on state interviews, on-site visits to 12 WAP subgrantees, detailed survey responses submitted by 24 WAP subgrantees¹, telephone conversations with public and private program managers, reading of program plans and previous evaluations, and Pendragon's experience in analyzing diverse energy conservation programs.

Two of the members of the project team assisted in evaluating the Kentucky WAP program as part of a regional monitoring effort for DOE approximately six years ago. That evaluation included on-site visits to the state office and nearly twenty field offices in Kentucky. Although this evaluation was and is not intended as a comparison with that earlier effort, we have felt free to comment on changes that have occurred over the last five years.

Equally important, we have drawn freely on our combined knowledge of weatherization and other conservation programs in other states. Since the four members of the Pendragon team have been intimately involved in state initiatives, we have used these experiences in formulating recommendations for Kentucky.

1.4 What This Report Is Not

In five months and with limited funds, it is not possible to provide a national assessment of all conservation initiatives while also conducting a detailing engineering analysis of specific weatherization techniques used in Kentucky. Thus, this report does not pretend to be either. Despite the request by the Senate to consider Kentucky's activities in relation to those of other states, we have not undertaken a detailed study of energy programs in all 50 states, since this was far beyond what could reasonably be accomplished.² Nor have we attempted to measure before-and-after energy usage and consumption patterns for residential structures, since that was far beyond what seemed possible. (Among other factors, that kind of study requires complete data on housing performance across two heating seasons.)

In short, this report does not cover the broad universe of all known programs, nor does it offer the depth of complete examination of one program. Rather, it intends to provide a reasonable balance of both breadth and depth, within the constraints of time and resources available.

Finally, we have not tried to second-guess legislators, nor tell them how to do their job, but rather to provide the independent and qualitative evaluation they requested.

¹ One subgrantee had not returned the survey prior to the writing of this report.

² Under separate cover, we are providing a brief summary of a few activities in other states that appear particularly promising or intriguing; without a detailed analysis of these other efforts, and a concomitant review of Kentucky's administrative structure and economic needs, we do not believe it worthwhile to make formal recommendations that Kentucky adopt one or another program. Thus, the companion document is intended as an "eye-opener" into other activities that might reasonably be investigated.

SECTION 2

A PRIMER ON ENERGY ASSISTANCE AND ENERGY CONSERVATION PROGRAMS

With energy, as with other public issues, the sheer number of "programs" can be confusing. It may help to begin with a basic distinction between energy *assistance* programs (to help families pay fuel bills) and energy *conservation* programs (to help families or institutions reduce energy consumption). In addition, some federal and state programs are designed to stimulate energy *production*, but these lie outside the scope of this report.¹

States typically have one energy-related welfare program but have many programs for energy conservation. The reason is obvious: it is much easier, administratively speaking, to pay people's bills than to reduce their energy consumption. Energy conservation efforts are to LIHEAP as public health programs are to Medicare.

The analogy is exact. There is no single best way to reduce families' medical costs; rather, there are many legitimate strategies -- inoculations against communicable diseases, free checkups, passive measures like water fluoridation, or education on nutrition, exercise, and substance abuse. Moreover, it is by no means obvious which is most effective for a particular problem or population, or when a proven and effective approach has reached its limits of usefulness.

The same is true of energy conservation programs. Conservation strategies include energy audits ("checkups" that leave decisions on treatment up to the client), passive measures like insulation (that "vaccinate" a house against certain kinds of heat loss), and educational measures designed to encourage energy-conserving habits.

As noted on the next page, current funding for the energy assistance program (LIHEAP) far outweighs that of the various conservation activities (WAP and all others). In fact, energy assistance receives more than two-thirds of the total funding. WAP receives nearly 27 percent of all funds, but this also represents 81.9 percent of the funding for conservation-only programs.

¹ One loan program (the Kentucky Energy Savers' Fund, also known as the HUD Solar Bank) to be discussed herein has been used to finance development of solar energy. Solar energy, because it is renewable, is considered as a way to conserve fossil fuels or to reduce reliance on nuclear energy. Further, the fund was primarily used for traditional conservation purposes.

Table 1

Current Funding for Energy Programs in Kentucky

PROGRAM	Federal Grant	State Match	PVE	Other/ Carryover	Total	Share
ASSISTANCE: LIHEAP	18,268,165		3,163,000	202,714	21,633,879	67.3%
CONSERVATION: GEER				200,000	200,000	.6%
ICP	549,005	30,000	500,000		1,079,005	3.4%
KECP	166,000	33,200		187,616 ¹	386,816	1.2%
KEES	64,400	12,880		158,424	235,704	.7%
WAP	3,101,814		2,388,000	3,139,522	8,629,336	26.8%
TOTAL	22,149,384	76,080	6,051,000	3,888,276	32,164,740	100.0%

National funding for all energy programs has declined during the last five years, and the following table shows that some programs have been harder hit than others.²

Table 2

Funding for Energy Programs -- Past Five Years

PROGRAM	FY 84	FY 85	FY 86	FY 87	FY 88	% Change FY 84-88
ASSISTANCE: LIHEAP	30,776,802	29,837,006	28,687,006	25,129,016	22,417,719	-27.2%
CONSERVATION: GEER	181,000	325,000	250,000	250,000	200,000	+10.5%
ICP	1,745,312	1,121,327	990,002	880,953	585,597	-66.4%
KECP	519,360	515,160	502,200	384,360	206,640	-60.2%
KEES	132,917	200,720	192,720	145,680	79,640	-40.1%
KESF	250,183	282,100	62,800	56,700	21,200	-91.5%
WAP	8,500,000	8,578,588	7,808,756	8,149,336	8,776,000	+3.2%
SUBTOTAL	11,328,772	11,022,895	9,806,478	9,856,029	9,859,077	-12.9%
TOTAL	42,105,574	40,859,901	38,493,484	34,985,045	32,276,796	-23.3%

¹ The amount in the "other" column for both KECP and KEES represent carryover funds from the preceding year.

² Some of the data is an anomaly, e.g., the GEER figure for FY 84, which was the first year of the program. Nonetheless, it is clear that funding for all programs has declined dramatically during the last five years.

In order to better understand these programs, the following thumbnail sketches are presented in a rough descending order of size (i.e., largest first), except when it seemed clearer to discuss similar programs side-by-side. More detailed information can be found in Appendix A.

2.1 Energy Assistance Programs (LIHEAP/HEAP)

There is only one major public program specifically designed to help needy families pay fuel bills: the Low-Income Home Energy Assistance Program (LIHEAP), known in Kentucky as the Home Energy Assistance Program (HEAP). In purpose and design, LIHEAP is a categorical welfare program, similar to Food Stamps and Medicare, except that it is designed to help pay for fuel rather than food or medicine. It is, of course, available only to low-income households.

There are two variants of LIHEAP: a "subsidy" (or "regular") program and a "crisis" program. "Subsidy" LIHEAP is limited to elderly households and to the handicapped, and the basis for qualifying for assistance is a sufficiently low income, rather than especially high fuel bills or some other energy-specific problem. That is, those elderly or handicapped who are also poor enough are simply assumed to need help meeting fuel costs. By contrast, the "crisis" program is available without age restrictions, but applicants must affirm the existence of an energy-related emergency -- a pending utility shut-off, a nearly-empty coal bin or woodpile, or a broken furnace. In Kentucky, these two variants of LIHEAP are administered locally by different agencies.

Both "subsidy" and "crisis" LIHEAP programs make payments to vendors, rather than directly to households. Obviously, these vendors benefit from LIHEAP in the same way that doctors benefit from Medicare. That is, in both instances, the service providers receive at least a partial guarantee that they will be reimbursed for services to customers who might not otherwise pay their bills, but who cannot be denied service without adverse publicity.

It is also possible under the "crisis" program to provide emergency assistance in some form other than paying bills: e.g., distribution of blankets after a fire, repair of a broken furnace, or purchase of a space heater. These things are sometimes done, but rarely.

Because federal regulations permit states to shift up to 15 percent of their LIHEAP funds to energy conservation projects, one sometimes hears references to "LIHEAP conservation programs," or "LIHEAP-funded WAP activities." Those who manage the LIHEAP activities can, at their initiative, choose to:

- 1) give up to 15% of their federal grant to the WAP program;
- 2) use up to 15 percent for weatherization activities independent of WAP; or
- 3) keep the 15 percent in LIHEAP.

In Kentucky, state officials have generally chosen the first two approaches, and it is for this reason that the Interim Joint Committee on Energy first investigated WAP. Because of the "LIHEAP-funded weatherization activities," there is a closer linkage between the two programs than might otherwise occur. (There are references to LIHEAP throughout this report, but especially in Sections 4 and 5, and Appendix A.)

2.2 Energy Conservation Programs (WAP and Others)

Most readers of this report are likely to be familiar with many of Kentucky's energy-related programs and already know what abbreviations like WAP, LIHEAP, EES, GEER, KECP, and SWAT stand for. Some readers, however, may welcome a short explanation of how each program fits into an overall picture. Accordingly, this section summarizes -- very briefly -- what the programs are intended to do. In Section 4, we go into more detail about actual WAP operations. In addition, Appendix A contains a detailed summary of each program's funding history in Kentucky (sources and amounts), target audience, constraints, etc.

Most of the conservation programs have been funded for the past 10-15 years primarily from federal grants, the amount of which is determined annually by Congress. A recent source of funds since 1983 has been interest on what are called Petroleum Violation Escrow (PVE) or "oil overcharge" funds, referring to overcharges by major energy producers that federal courts have ruled must be restored to consumers. The most recent funding level for all energy conservation programs in Kentucky has been roughly \$9 million.

2.2.1 Weatherization Assistance Program (WAP)

In Kentucky, the largest energy conservation program, WAP, "weatherizes" low-income residential housing (including many mobile homes) to prevent unnecessary heat losses. This means plugging air leaks, installing insulation, and improving the efficiency of heating systems. The actual installation of weatherization measures is done by local project crews or sometimes by private contractors working under rules set by the program. Current funding in Kentucky is about \$8.1 million, from all sources. WAP clients are low-income households (defined as those with incomes at or below 125 percent of federally established standards for poverty).

2.2.2 Institutional Conservation Program (ICP)

The second largest energy conservation program in Kentucky is the ICP, which might be thought of as weatherization¹ for schools and hospitals. (This means only that ICP and WAP are variants of the same general approach to

¹ Throughout this report, the uncapitalized word "weatherization" is used to refer to a generic process, as distinct from WAP, the specific program.

conserving energy in buildings. The two programs are aimed at different groups and are distinct in all administrative respects.) The ICP provides grants that pay for energy audits for hospitals and educational facilities; these grants may be followed by other grants to install the improvements the audits suggest will be most cost-effective. Current funding is about \$1,000,000. Eligible applicants are public and private nonprofit hospitals and schools, including universities.

2.2.3 Related "Weatherization-type" Programs (GEER and Project WARM)

Several other Kentucky programs represent variations on the weatherization approach. None of them operate statewide¹, and most began as "pilots" using one or another source of discretionary funding. All are small relative to WAP and even to ICP (and, of course, compared to LIHEAP). Some are not expected to be refunded after the current fiscal year.

Grants to the Elderly for Energy Repairs (GEER) is a weatherization-type program that closely resembles WAP, except that:

- (a) it is limited to the elderly (WAP gives priority to the elderly and to the handicapped, but serves others),
- (b) it has broader income limits (150 percent of poverty compared to WAP's 125 percent),
- (c) it has less restrictive per-house expenditure limits (up to \$3,000, compared with WAP's \$2,000, but WAP's \$1,600 average is fixed by law while GEER's similar average is discretionary),
- (d) it has less clearly defined technical standards (a list of five broadly defined priority measures, similar to WAP's but spelled out in less detail), and
- (e) it imposes less burdensome administrative restrictions on local grantees (almost none, in fact, compared to WAP's detailed reporting requirements).

In general, although its state-level sponsors may disagree with our assessment, GEER appears to us to be virtually identical to the WAP program as it was roughly ten years ago -- i.e., before several factors (expanded size, increased technical knowledge, and concerns about possible fiscal abuse and wasted efforts) led to the imposition of more nearly uniform technical and administrative requirements on local WAP subgrantees.

Project WARM, operating in Louisville, began as another variant of the weatherization strategy. It initially emphasized "no-cost/low-cost" measures:

¹ Although GEER operates throughout the state, it does not operate in all counties of the state.

caulking, sheet plastic to cover windows, and other attempts to prevent heat loss as cheaply as possible. WARM makes extensive use of donated materials and (originally) of volunteers. In general, the advantage of this approach is its low cost and potential for significant short-term savings; the disadvantage is that it offers what are quite literally stopgap measures, many of which are not expected to last more than one heating season. WARM also puts more emphasis on client education than does WAP, or at least more than do most WAP projects. WARM now operates as an integral part of the Louisville WAP program and, as such, tailors its energy conservation approach to conform to WAP guidelines.

2.2.4 The Three "SWAT" Programs

Three other programs, each using the acronym "SWAT," deal with energy conservation in buildings and hence are discussed ahead of the larger programs within which they are lodged.

Senior Weatherization and Training (SWAT-1, SWAT-2), a program for senior citizens, consists of two distinct subprograms, known as SWAT-1 and SWAT-2. SWAT-1 involves using elderly volunteers to install no-cost/low-cost weatherization measures, to do other simple conservation projects (e.g., making long, sausage-shaped bolsters to block under-door drafts), and to conduct client education. SWAT-2 (which was originally known as Partners in Low-Income Residential Retrofit, or PILIRR) was one of several DOE demonstration programs funded in hopes of raising more private-sector resources for residential energy conservation. Its emphasis is on securing donations of materials, principally from private corporations. SWAT is now funded out of the Kentucky Energy Extension Service (KEES), summarized in Section 2.2.6, below.

Student Weatherization Audit and Training (SWAT-JR): Note that although SWAT-JR bears the same acronym as the two preceding ones, the letters stand for different words. It is, in fact, an entirely different program. Its focus is training and using high-school students to identify energy-conservation opportunities within their own school buildings. Teachers and student participants from selected school districts attend a summer training program and return to their districts to apply their new-found knowledge during the following school year. They may identify either energy-saving practices (e.g., keeping windows closed) or potential capital improvements (e.g., additions of storm vestibules). This makes SWAT-JR a cross between a low-cost/no-cost weatherization strategy like SWAT-1 and the audit phase of an institutional program like ICP. It is a submeasure of the Kentucky Energy Conservation Program (KECP), summarized below.

2.2.5 Kentucky Energy Extension Service (KEES)

The emphasis of the KEES is based on a three-year plan submitted to and approved by DOE. As the name implies, the original idea behind the KEES was something like the Cooperative Extension Service (originally known as the Agricultural Extension Service and still called that in some states). KEES, however, has

never created a more-or-less permanent staff analogous to the Cooperative Extension Service's "county agents."

In previous years, KEES focused on the commercial/industrial sector. Its activities included advising small businesses and manufacturers (from florists to pizza-makers) on energy-efficient equipment and practices. Currently, its target is be the low-income elderly -- generally speaking, the same group served by WAP and GEER. SWAT-1 and SWAT-2 are, therefore, the centerpiece KEES program for the current year.

At a lower level of effort, the KEES continues to assist small commercial/industrial clients. Its main approach in this area will be continued dissemination of a series of conservation-oriented videos produced during 1985-86.

2.2.6 Kentucky Energy Conservation Plan (KECP)

Like KEES, KECP is a package of conservation efforts. (SWAT-JR is funded under KECP.) The whole package includes program efforts largely outside the scope of this report: carpool/vanpool projects, review of lighting and thermal efficiency standards, and audits of energy use in state government buildings. KECP is sometimes used as a "catch-all" for worthwhile efforts that do not readily fall into other programs, including emergency preparedness for energy crises, water conservation programs, energy supply-and-demand studies, and general education.

2.2.7 Residential Conservation Service (RCS)

The RCS is a residential energy audit program. It is not restricted to clients of any particular age or income, and it does not pay for the installation of conservation measures -- merely for the identification of conservation opportunities. The actual audits are largely paid for by utilities, who are allowed to put these costs in their rate base and thus pass them through to all customers. The audits are usually conducted by private contractors on retainer by the utilities. Homeowners receiving the audits pay a flat fee of \$15.00 for the service. Eight major utilities, collectively serving approximately 72 percent of the population of the State, participate in the RCS program. (Table 2.3, below, contains data derived from RCS audits.)

2.3 Housing and Energy in Kentucky

WAP and related energy conservation efforts can be of great importance to Kentucky. The state is characterized by housing stock whose condition is significantly worse than the national average. Despite rich energy reserves, it is a poor state and one whose population is aging. Its climate, especially in the eastern part of the state, is cold enough to cause serious hardships for low-income homeowners and tenants.

According to the 1980 Census, the median value of housing in Kentucky was \$34,200 (in 1980 dollars), placing Kentucky in 47th position among the 50 states. (Only Alabama, Arkansas, and Mississippi reported lower median values.) Moreover, by most measures, this housing is in poor condition. For example, only six other states had a higher percentage of homes without telephones. Only one -- Alaska -- had a higher percentage of houses lacking complete plumbing facilities. (That percentage for Kentucky was 6.5 percent; for Mississippi, the next-highest in the lower 48 states, the percentage was 5.9 percent.)¹

A 1984 study performed by the Kentucky Department for Employment Services (which administers the WAP program) reviewed the results of WAP and Residential Conservation Service (RCS) audits on a sample of 1508 dwelling units (489 mobile homes and 1,019 other types of construction). The RCS program, unlike WAP, is not limited to low-income households. Not surprisingly, the WAP audits showed much larger needs for basic weatherization measures, although even the RCS audits revealed that deficiencies were common.

Table 3
Comparison between RCS and WAP Audits²

Weatherization measure	Percent of sample needing measure	
	RCS	WAP
Caulking	50	84
Weatherstripping	65	88
Ceiling insulation	51	43
Wall insulation ³	28	55
Structural repairs	6	10
Roof leaks	6	16

The population of Kentucky is poorer than the national average and, on average, is aging faster. In 1979, more than 350,000 households (27.8 percent of those in the state) had incomes lower than \$7,500 -- about 30 percent more than the national average. The number of children in the age range of five years to

¹ U.S. Department of Commerce, Bureau of Census, State and Metropolitan Area Data Book 1986 (Washington, GPO, 1986).

² Adapted from Housing Characteristic Study, 1984 Low Income Home Energy Assistance Program; Weatherization, (Kentucky DES, 1984).

³ Insulation data excludes mobile homes. Ceiling insulation data between RCS and WAP not comparable because RCS audits used a standard of R-30 for ceilings while WAP used R-19. I.e., for housing units with some existing insulation, WAP rated "adequate" some units that RCS would have rated "inadequate."

fourteen years dropped between 1970 and 1980, while the number of elderly people increased sharply. The median age was 29.1 years, compared to 27.5 years in 1970.

Although baby boomers in the 20-40 age range increased, changes were low or negative in the peak earnings age range of 40 to 55. (The increases were marked at the upper end of the age range: 19.2 percent for those 65-69; 21.5 percent for those 70-74; 22.2 percent for those 75-89; 19.7 percent for those 80-84, and a striking 31.8 percent for more than 26,000 individuals over 85 years. These increases are projected to be even more dramatic for the nearly completed decade 1980-1990.¹

Analysts at the Urban Studies Center at the University of Louisville estimated that, in 1980, there were 308,633 households in Kentucky eligible for WAP -- or 21 percent of all households.² The study suggested that, at the current rates of completion, it would take nine years to serve highest-priority households and 40 years to serve all eligible households. In fact, due to the changing demographics of the state, it may take longer. The WAP State Plan for 1988-89 estimated the total eligible at 293,554 (160,605 home-owning households and 132,949 tenant households).³

Home ownership in Kentucky is higher in percentage terms than the national average, but appears to be dropping. The best estimate is the Census data of 1980, which put the rate at 70 percent. However, a study by the Kentucky Housing Corporation and the University of Louisville indicates that a "conservative" estimate of the 1986 percentage would be 67.7 percent and that the actual figure might be as low as 62 percent.⁴

The University of Louisville study also includes the following finding:

. . .as incomes increase, so do homeownership rates. For each year [considered in the analysis], there is a fairly steady stairstep progression in the homeownership rate from lower to higher income categories.⁵

¹ Editors, American Demographics Magazine, State Demographics: Population Profiles of the 50 States (Dow Jones-Irwin, 1984), pp. 134-136.

² C. Theodore Koebel et al., Weatherization Assistance: Eligibility, Supply, and Unmet Need (Urban Studies Center, University of Louisville, 1983), p. i.

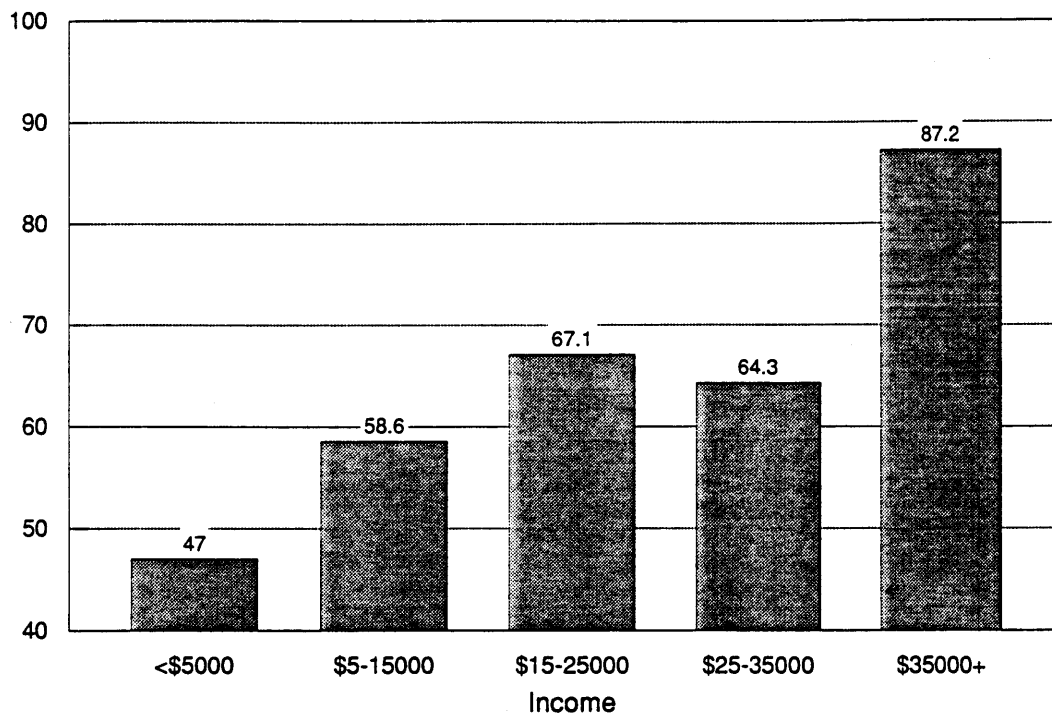
³ DES/CHR, WAP State Plan, FY 1988, pp. 61-2.

⁴ C. Theodore Koebel (Urban Studies Center, College of Urban and Public Affairs, University of Louisville) 1986-87 Housing Report for Kentucky (1988), pp. 2-3.

⁵ 1986 Housing Report for Kentucky, p. 3.

The following chart, adapted from the Louisville report, shows this dramatically. Only 47 percent of those in the lowest income bracket own homes, compared to 87.2 percent in the highest bracket.

Figure 1
Percent of Home Ownership by Income Bracket¹



The low incidence of home ownership among low-income groups has important implications for the WAP program. As we discuss in section 3.6.7, WAP regulations in Kentucky (not based on national standards) limit weatherizations of tenant-occupied dwellings to 15 percent of total completions.

It may seem odd that a state that producing as much energy as Kentucky needs to stress energy conservation. In 1986, Kentucky's coal mines produced almost 154 million tons of coal, roughly 27 percent of the nation's total. This figure, however, was only slightly higher than the 150 million tons produced five

¹ As adapted from *Ibid.*, p. 3. The chart itself is based on U.S. Bureau of the Census Current Population Survey.

years earlier.¹ Yet, nationally, about 86 percent of coal production is used for the generation of electricity. Although it may be nearly 100 percent efficient at the point of use (i.e., in the home), roughly two-thirds of the energy contained in the coal is lost during generation, transmission, and distribution. As a result, electricity is probably the least energy-efficient way of meeting residential heating needs. (By way of comparison, oil furnaces achieve point-of-use combustion efficiencies in the 70-80 percent range and gas heaters can achieve combustion efficiencies of nearly 100 percent. Seasonal efficiencies are much lower, due to chimney losses and other factors, but not as low overall as those for electricity.)

Like the nation as a whole, Kentucky uses relatively little of its plentiful coal for direct space heating and most for electricity. The U.S. Department of Energy (DOE) estimates that in 1970 residential energy consumption in Kentucky was based on 190 thousand tons of coal and 6,987 million kilowatt-hours of electricity. By 1986 the totals were 102 thousand tons of coal burned directly for heat and 15,619 million Kwh of electricity. During the same period, residential heating with natural gas fell from 86 billion cubic feet to 59 bcf; heating with petroleum-based fuels (distillates, kerosene, and LPG) declined from 5,836,000 barrels to 3,978,000 barrels.² As a matter of making a transition from scarce fuels to relatively plentiful fuels, this trend is positive; as a matter of economy and environmental protection, it poses problems.

In summary, the data on housing, poverty, an aging population, and a recently flat demand for coal suggest that conservation in the residential sector can be critical for many Kentucky households. The programs described in this report were designed, for the most part, to meet national needs. But they may be especially important for Kentucky.

¹ Coal Data 1988 Edition (National Coal Association, 1988), p. II-8.

² DOE, Energy Information Administration, State Energy Data Report 1960- 1986, p. 130.

SECTION 3

THE WEATHERIZATION ASSISTANCE PROGRAM IN KENTUCKY: DESCRIPTION AND COMMENTS

This section contains a description of how the Weatherization Assistance Program operates in Kentucky, followed by an assessment of its overall strengths and limitations. (Recommendations appear in Section 5.)

The comments that appear here are based on five sources:

- (1) a review of Kentucky's State Plan for WAP and of its Weatherization Operations Manual;
- (2) interviews with state-level staff members;
- (3) a series of one-day site visits by two Pendragon evaluators to 12 local WAP projects;
- (4) a mail survey of all Kentucky WAP subgrantees; and
- (5) a limited review of relevant practices and results in other states.

Of these sources, the site visits and the mail survey were the most important in forming first-hand impressions.

The site visits were made during December and February by two evaluators, each of whom visited six local Weatherization projects. (Three of the 12 projects were chosen for their size; the other nine were selected randomly by the Legislative Research Commission.) During those visits, the evaluators interviewed project staff, examined file folders for the ten houses or mobile homes most recently weatherized by the project, and inspected at least two recently weatherized units (or, in some cases, units for which work orders had been issued but for which work had not yet been completed). The objective of these visits was neither to monitor the individual subgrantees' compliance with all applicable federal or state regulations nor to evaluate them separately. Rather it was to enable the evaluators to understand the WAP program as a whole -- what it is currently doing and why. A list of the projects visited appears in Appendix C.

A mail survey was completed during late February and early March. Twenty-four of the 25 subgrantees in Kentucky responded. A copy of the questionnaire may be found in Appendix D.

3.1 WAP: Goals and Legislation

The first federal weatherization programs were begun in 1975 as a response to fuel shortages and price increases resulting from the 1973 oil embargo. The Office of Economic Opportunity (later the Community Services Administration, or CSA) established the first programs and continued to fund them through 1979. In 1977, the Federal Energy Administration (now part of DOE) was authorized to begin a similar program, which ran in parallel with that of CSA until 1979 and which is the basis of WAP as it now exists. Its goals are to conserve energy and to assist those persons least able to afford high energy costs, especially the elderly and handicapped. Its authorizing legislation is Title IV, Energy Conservation and Production Act, PL 94-385 (42 U.S.C. 6851 et seq.), as amended. Federal regulations appear in 10 CFR Part 440 "Weatherization Assistance for Low-Income Persons."

Since fiscal year 1982, states have also been authorized to use up to 15 percent of the funds received from LIHEAP for weatherization of low-income dwellings. LIHEAP is one of several block grants authorized by the Omnibus Budget Reconciliation Act of 1981 (PL 97-35, August 13, 1981). Subject to the broad goal of helping low-income households save on energy bills, federal requirements regarding the use of LIHEAP weatherization funds are minimal. For LIHEAP funds, states have substantial flexibility in designing programs, including the types of measures to be installed, the maximum cost for weatherizing a dwelling, and (within the limits of the Act) the income limits of households to be served.

3.2 WAP in Kentucky: the State Administrative Framework

The WAP program in Kentucky is administered by the Weatherization Programs Branch, Division for Job Services and Special Programs, Department of Employment Services (DES), Cabinet for Human Resources (CHR).

Under a plan for reorganization approved within the CHR and submitted to the Governor for final approval, the WAP program would be moved to the Department for Social Insurance (DSI), which now administers LIHEAP. Both programs would be housed within a newly created Energy Assistance Branch within the Division of Policy and Program Administration. If approved by the Governor, the reorganization will take place on or before July 1, 1989.

During the 1988-89 program year ending June 30, 1989, the funds from all sources applied to WAP totalled approximately \$7,929,000 (35 percent from DOE, 35 percent from PVE funds, and 30 percent from LIHEAP). (A more detailed breakdown of these figures and a brief funding history for the program appears in Appendix A.) PVE funds, once applied to a particular program, are automatically governed by the rules of that program. As noted above, federal law does not require this of LIHEAP funds. However, for the sake of uniformity, the DES has chosen to consider all monies used for weatherization as subject to DOE regulations.

Funds are allocated to 25 subgrantees according to a "relative need" formula based on the number of: 1) low-income households; 2) elderly persons; and 3) handicapped individuals per county.

Ten percent of DOE funds may be spent for program administration. DES reserves part of this for state-level administration and passes the remainder (slightly over five percent) through to subgrantees. During the current year, the DES allocated the full-time equivalent of 8.4 staff years to the program for bookkeeping, financial monitoring, general contract management, and subgrantee monitoring. Of these functions, monitoring accounted for 60 percent of the authorized staffing (4.5 professional person-years and a half-time clerical position). There have been, however, two monitoring vacancies during much of the current program year.

The DES also provides for subgrantee training through a subcontract with the Kentucky Association for Community Action (KACA), located in Frankfort. The monitoring and training functions are discussed in more detail in Section 3.5 below.

3.3 WAP at the Local Level: Structure and Administration

At the local level, 25 subgrantees administer the WAP program, 22 of which are Community Action Agencies (CAAs). Three programs are administered by agencies of local government: the City of Ashland, the City of Louisville, and Jefferson County. A map of these subgrantees can be found on the following page. That is followed by a list of WAP subgrantees, showing the number of completions targeted for the current year.

Of the 24 WAP subgrantees responding to our survey, 17 employ in-house crews to install weatherization measures; five rely on private contractors; and two use a combination of in-house crews and outside contractors. (In one case, in-house crews usually do the basic weatherization, while outside contractors do furnace system repair or other, more complicated, modifications; in the other, the differentiation is by geographical boundaries.)

Fig. 2



Table 4

*Weatherization Subgrantees by Proposed Number of Completions
1988-89 Program Year*

Subgrantee	# on Map	Proposed Budget	Total Units	Cost/ Unit
Ashland	24	197,876	65	1,659.63
Multi-Purpose SC	16	121,855	76	1,603.36
Tri-Co Comm EOC	21	155,491	91	1,708.69
Licking Valley	14	156,489	92	1,700.97
KY Comm EOC	10	153,608	104	1,477.00
Middle KY River	15	179,390	108	1,661.02
Gateway	8	216,592	129	1,679.01
Harlan County	9	209,618	134	1,564.31
Bell Whitney	2	242,209	150	1,614.73
Jefferson County	25	266,160	167	1,593.77
LKLP CAC	13	268,153	159	1,686.50
NKCAC	18	341,070	187	1,823.90
Ky River Foothills	11	304,174	193	1,576.03
CALF	5	340,007	201	1,691.58
Northeast KY	17	318,009	213	1,493.00
West KY AS	22	362,015	213	1,699.60
Audubon	1	372,303	221	1,684.63
Central KY	6	393,552	228	1,726.11
Blue Grass CAA	4	396,750	235	1,688.30
Daniel Boone	7	396,410	243	1,631.32
Pennyryle	19	463,414	274	1,691.29
So KY CAA	20	482,601	283	1,705.30
Big Sandy	3	515,654	315	1,637.00
City of Louisville	25	540,387	320	1,688.71
Lake Cumberland	12	576,238	350	1,646.39
TOTAL		7,880,025	4,751	1,658.60 ¹

The basic functions performed are the same in all cases: client selection, pre-inspection of a house or trailer to determine what will be done to weatherize it, the actual installation of weatherization measures on the housing unit, and a post-inspection to ascertain that the job was done according to specifications. Each of these functions is described below.

¹Average unit costs may exceed \$1600 because these figures include 5.6% administrative costs and liability insurance (usually around 1.0%). All figures are estimates from the WAP State Plan, subject to end-of-the-year adjustments.

3.3.1 Client Selection

To be eligible for WAP, applicants must be low-income (defined as at or below 125 percent of federally established poverty levels). The elderly and the handicapped are given priority. In Kentucky, at least 85 percent of the households whose homes are weatherized must be homeowners; i.e., no more than 15 percent may be renters. This limitation on weatherizing rental units does not appear in federal regulations, which specify only that landlords must agree not to raise rents because of weatherization and that any enhanced value of the property must not be "undue or excessive." The 15 percent ceiling is established by the DES in response to its administrators' understanding of Kentucky legislative guidelines; the rule is extended to individual subgrantees, who may request waivers to exceed 15 percent.

Because most subgrantees are Community Action Agencies (CAAs), they use their own staff to screen applicants at "outreach" centers supported by Community Services Block Grant (CSBG) funds. (Others, like the City of Louisville, depend heavily on general advertising and referrals from other agencies.) The intake workers at these locations prioritize applicants according to criteria appearing on an application form (WX-1), the relevant portion of which is reproduced below.

Fig. 3

Applicant Ranking Scale, from Form WX-1

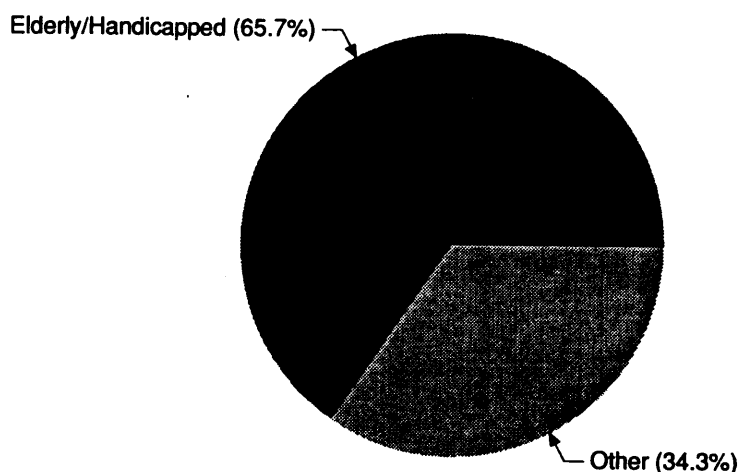
PRIORITY RANKING			
Number in Household			
total number	_____ X1 =	_____	points
Number of elderly	_____ X5 =	_____	points
Number of handicapped	_____ X5 =	_____	points
<hr/>			
Condition of Home			
health or life threatening situation	= 12 points		
needs emergency work	= 8 points		
needs extensive repair or weatherizing	= 6 points		
needs considerable weatherizing	= 4 points		
needs some weatherizing	= 2 points	_____	points
<hr/>			
Family Income			
100% - 125% of poverty level	= 1 point		
75% - 99% of poverty level	= 2 points		
less than 75% of poverty level	= 3 points	_____	points
<hr/>			
Cost of Fuel (divide cost of fuel by annual income)			
0 - 4%	= 1 point		
5 - 9%	= 2 points		
10 - 15%	= 3 points	_____	points
<hr/>			
Special Circumstances			
home bound	= 5 points	_____	points
		TOTAL POINTS	_____

In practice, the presence of elderly or handicapped individuals tends to outweigh all other factors. It is not possible for applicants to differ by more than two points each on "family income" or "cost of fuel divided by income." "Condition of home" might seem to offer more basis for choice, but intake personnel have no real way of knowing anything about it. They usually enter "two," "four," or "six" points, depending on what applicants tell them. We saw a number of client files containing entries suggesting that applicants, accorded high priority because of age, were spending less than three percent of their incomes on fuel and were living in houses needing only "some weatherizing" (emphasis added). (In fact, this statistic is not meaningful, since the estimate of the percentage of income spent on fuel may be based either on a review of fuel bills or simply on a client's memory.)

The WAP State Plan¹ projects that 57 percent of Kentucky's completions would be dwellings occupied by at least one individual who was elderly, handicapped, or both. Our mail survey of subgrantees showed a ratio of 65.7 percent elderly and/or handicapped, based on each reporting agency's ten most recent completions -- meaning units completed mostly during January and February. (No agency reported fewer than four elderly/handicapped completions among the ten files samples; three reported that all ten fell into this category.)

Fig. 4

Elderly/Handicapped Households Served, Based on Recent Completions



¹ Cabinet for Human Resources, Department for Employment Services, Annual Plan: Weatherization Assistance Program for Low-Income Persons, FFY '88, January 25, 1988.

The number of rental units weatherized is limited by state regulations to 15 percent. The sample reported in our survey closely approximated this average, but showed wide variation from agency to agency. Ten agencies reported that none of their ten most recent completions involved rental units.

3.3.2 Pre-weatherization of Dwellings

Before work can begin on a house or trailer, someone must decide what needs to be done, based on an inspection of the dwelling unit involved. (This inspection is always made by a member of the project staff, usually called an "inspector," but whose job description will sometimes be termed "field supervisor" or "energy auditor.") The inspector completes this stage of the process by filling out a work order for the crew or contractor to perform the actual weatherization work.

In writing this work order, inspectors follow a list of technical priorities established by DES, based in turn on an energy audit procedure described in a DOE publication called Project RetroTech. (These priorities for weatherization measures should not be confused with applicant priorities for service described in 4.3.1 above.) Measures to reduce cold air infiltration are at the top of the list, followed by insulation. The DES State Plan indicated an intention to introduce a heating system program during the current program year, but this has been achieved by only a few agencies.

The WAP State Plan calls for installing (without prior approval) only those measures with an estimated payback period of five years or less. (This is roughly equivalent to a 14 percent annually compounded savings rate. In Section 3.7, we explain why we think it unlikely that average savings per house are as high as this.)

Kentucky subgrantee inspectors make these judgments following criteria promulgated by DES, disseminated through memoranda and DES-sponsored training, and monitored by DES. In applying these criteria, they rely on observation and experience; they do not use any diagnostic technology increasingly used in other states -- blower doors or infrared scanners.¹ Our review of files indicated conscientious completion of Form WX-6 (Weatherization Program Home Heating Audit, which contains payback calculations); our interviews with project staff and our review of survey data has led us to conclude that this was largely a paper exercise and rarely the basis for actual decisions on which measures to install.

Some projects encourage inspectors to make a full list of everything they feel should be done to weatherize a house, without regard to cost (i.e., to list everything allowable within DOE technical limits and sometimes other measures that DOE will not pay for, such as correction of health and safety problems). It then

¹ A blower door relies on a large door-mounted fan to increase or decrease the difference in air pressure between the inside and outside of a house as a way of measuring leakiness and locating sources of infiltration. Infrared scanners assist in pinpointing heat losses not visible to the naked eye.

falls to the weatherization coordinator to make the final decision about what can be done within the \$1,600 per-unit average or the \$2,000 per-unit maximum.

More frequently, the inspector knows the project's budgetary limits and writes the work orders accordingly. Most subgrantees we visited tend to aim for the \$1,600 average target on every unit. Coordinators were often explicit about stating their belief that each client, once on the action list, is entitled to approximately the same level of expenditure of every other client. (The results of this approach are shown in Section 3.4.2, and our comments on its implications are contained in Section 3.6.3.)

3.3.3 The Logistics of Weatherization

As noted, 21 of 25 Kentucky projects use in-house crews for the actual installation of weatherization materials. Our survey shows that a typical crew consists of two or three workers. The number of crews used by each agency naturally varies with the size of its budget and the geographical area it serves. The two largest agencies using crews employ eight and ten crews, operating out of five and ten offices, respectively. According to coordinators, completion times per dwelling unit are typically about 3-5 person-days (i.e., two working days for a crew of two).

In our mail survey, we asked subgrantees to describe their staffing by broad job descriptions (coordinators, inspectors, crews, others). No clear patterns emerged. Some of the smaller agencies employed as many inspectors as larger ones, but some smaller agencies use inspectors to supplement crew workers when necessary, so the range of actual working arrangements defies generalization. The survey also shows that crew workers' salaries range from \$3.35/hour for the lowest-paid employee to \$7.44/hour for the highest paid. (The range may be more a function of seniority than labor-market conditions.) Hourly wages tend to be concentrated at the lower end of the scale, as the table below indicates.

Table 5

Hourly Wages Paid to Crew Members

		Number of agencies paying					Totals
		\$3.00-3.99	\$4.00-4.99	\$5.00-5.99	\$6.00-6.99	\$7.00-50	
Highest-paid crew member	1	4	5	9	1		19
Lowest-paid crew member	7	10	2	0	0		19

Four agencies subcontract for weatherization work with private building contractors. The Louisville program might actually be considered as operating in a mixed mode -- i.e., a combination of crews and contractors. This is a result of historical factors rather than planning. At the initiative of private individuals, Project WARM was created to utilize volunteers for client education and to install what are often known as "low-cost/no-cost" weatherization measures -- caulk, weatherstrip, and plastic sheeting for windows. (In this instance, the materials were, and are, donated by manufacturers.) Initially, according to those interviewed, there was no coordination between WARM and the WAP program, which was then being run by the local CAA. Both agencies might work with the same clients, and the WAP crews sometimes ripped out the volunteers' work and started over.

After the City took over the WAP program, coordination improved, and WARM provides "infiltration crews" for the WAP program as a whole. That is, WARM crew chiefs (who are now salaried) review the WAP inspector's work order, and check off those items they and their volunteer helpers will install, which in practice means caulk and weatherstrip (but not plastic sheeting). After the work is completed, Project WARM is reimbursed according to an agreed-upon schedule.

After WARM personnel have done their work, contractors install whatever else appears on the work order -- typically insulation and some window and door replacement. (The City of Louisville does not weatherize trailers, which are not permitted within the city limits.)

3.3.4 "Program Support": Accounting for Overhead Costs

"Overhead" is an unpalatable term in public programs, so program managers find other words for it (in the case of WAP, "program support"). By whatever name, overhead is nevertheless a fact of life. State officials indicate that they monitor overhead costs closely. Overhead costs are a combination of two different classes of costs:

- (1) conventional overhead items called "program support" in DOE reporting forms (rent, the cost of tools and equipment, salaries of WAP coordinators, warehouse clerks, and other individuals not involved in actual installation, etc.) and
- (2) indirect labor costs (wages paid for installers that are not charged to the specific job, such as fringe benefits, sick leave, travel time, etc.)¹

¹In fact, the state gives subgrantees an option of how they want to charge indirect labor. As an example, assume that one crew member makes \$5/hour and has fringe benefits of 20 percent. If he works six hours at the job site and spends two hours travelling to and fro, the labor cost directly attributable to the job is \$30. In addition, he has travel costs of \$10, and fringe benefits of \$10 for the day. According to state representatives, each subgrantee agency has the option of

DOE regulations require that these costs be allocated on a per-house basis. (E.g., a project planning 100 completions will add one percent of its program support costs to each house.) Since this means that overhead costs must be spread across completions as the year progresses, subgrantees must estimate these costs at the beginning of each year and update them periodically.

Each month, the state WAP office uses each subgrantee's report to compute indirect labor (by subtracting direct labor charged to houses from total labor for all weatherization installation crews). Indirect labor is then added to program support in the narrow sense (rent, tools, administrative labor, etc.), and finally divided by the number of housing units completed and in progress. The result is a realistic running estimate of actual overhead.

If this figures differs significantly (i.e., by more than about \$25 per completion) from the estimate being used by a subgrantee, the subgrantee is urged to change its estimate. State officials indicated that some subgrantees monitor overhead carefully on their own and revise monthly; others revise quarterly; still others revise it only when warned.

The following chart, for the two most recent program years, show the variability of overhead costs across projects that use crews. (Projects using contractors, except for relatively inexpensive operations, such as heating system tuneups, have been excluded since much of their overhead expenses are shifted to the contractors' "labor" charges.)

Table 6

Program Support Costs, 1987-88 and 1988-89

	Low	High	Average	Median
1987-88	\$242	\$669	\$496	\$545
1988-89	\$386	\$669	\$505	\$534

3.3.5 Client Education

Energy consumption in a house is a function of two major factors: (1) the physical characteristics of the house and its heating system, and (2) the behavior of

including or not including the travel and fringe as direct labor (specific to the given job) or indirect labor.

its occupants. Although WAP is primarily concerned with physical improvements, its administrators are aware that client attitudes and behavior are also important. (This factor is always mentioned when the results of measured savings prove disappointing.

In such cases, the most frequently cited explanation is that occupants changed their behavior in some significant way -- e.g., began using a previously closed room, kept thermostat settings high to enjoy new-found comfort at no added cost, or even opened windows because the weatherized houses were "too tight.")

In general, however, the amount of effort devoted to client education is variable. In our mail survey of subgrantees, we asked them about their client education practices. The question, and the number of responses to each possible answer, are shown in the table on the next page.

Table 7

Responses to Question on Client Education Practices

"Which, if any, of the following methods of client education has your project used within the past 12 months? (Check as many as apply.)"

Checked exclusively	Checked this + other	
<u>7</u>	<u>4</u>	Nothing with any regularity, except answering client questions.
<u>10</u>	<u>5</u>	We make a routine practice of having the crew chief or inspector talk to clients about maintenance and other energy-saving practices.
<u>0</u>	<u>5</u>	We make a routine practice of leaving pamphlets or other printed materials with clients whose houses have been weatherized.
<u>0</u>	<u>2</u>	We show videos, films, or have Q&A sessions with groups of clients.
<u>0</u>	<u>2</u>	We sponsor (or coordinate with other answers) programs teaching people how to install and use no-cost/low-cost measures.

Although approximately two-thirds of the respondents indicated that they routinely talk to clients about energy-saving practices, we do not know how thoroughly or systematically this is done. The only aggressively pursued client educa-

tion efforts we heard described during site visits was in Louisville. Project WARM staff, as part of the program administered by the Louisville Department of Housing and Urban Development, were described as spending approximately one hour with each household, explaining energy conservation principles, the operation of thermostats, and describing low-cost measures clients could undertake for themselves to supplement or maintain the effectiveness of measures installed by the WAP program contractors.

3.4 WAP at the Dwelling-unit Level: What Is Actually Done to Houses, Apartments, and Mobile Homes

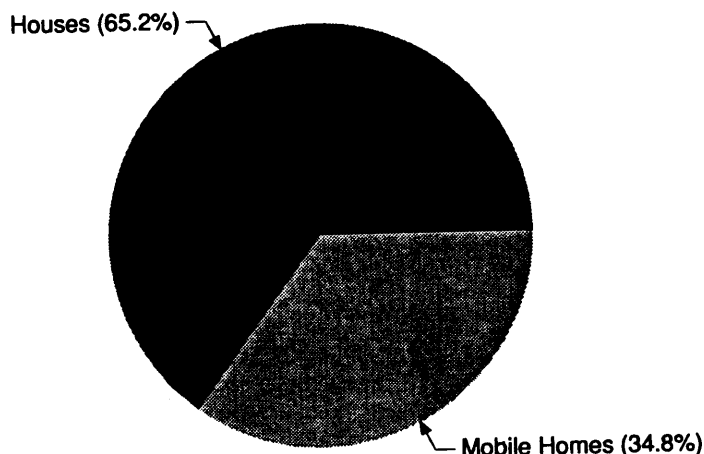
In the last analysis, what determines whether or not weatherization saves energy, and how much money it saves households, depends on the nature and quality of work done house-by-house. Accordingly, both our site visits and mail survey focused closely on the measures being installed by subgrantees.

3.4.1 Housing Stock Being Weatherized

The following chart shows the current breakdown by type of dwelling unit weatherized:

Fig. 5

Completions by Housing Type, Based on Survey



The typical dwelling unit weatherized by Kentucky subgrantees is small. We did not ask subgrantees to report square footage on our mail survey, but we recorded this statistic from a sample of ten files at most of the projects we visited. For houses in urban areas, the mean square footage was about 1100 square feet. Houses in predominantly rural areas were smaller still, averaging around 800 square feet. Mobile homes, of course, tend to be smaller, often around 700 square feet, and occasionally as small as 320. (But many units classified as "mobile homes" have been enlarged by additions, sometimes another mobile unit, sometimes frame construction.)

About the only safe generalization that can be made about the condition of this housing is that it is highly variable. Many (perhaps most) weatherized houses would fall near the lower end of any scale measuring condition. However, our observers were surprised to visit a few units in good to excellent condition – occasionally units built, maintained, and furnished to standards one associates with middle-class professional households. That some such units are being weatherized is not surprising, since client eligibility standards emphasize age and current income, rather than net assets, living conditions, or actual energy consumption. (Attempts by project staffs to show us houses within reasonable travel time of their offices may have resulted in our seeing houses slightly better than those in extreme rural areas.)

Certainly the worst of the housing being weatherized is in very bad condition indeed, confirming the Census data cited in Section 2.3 above. Often evidence of physical decay is apparent to a casual observer: missing boards, cracked or broken windows, and sagging roofs. A dilemma faced at some time or other by every project is whether a unit is worth weatherizing at all. Occasionally, the decision must be negative. There is, for example, no point in insulating an attic under a leaky roof, for water will not only rob the materials of their insulating value, but, more seriously, may cause ceilings to cave in under the weight of waterlogged fiberglass or cellulose. DOE/DES regulations recognize this to the extent of providing for roof repairs, but there is seldom enough money for a new roof. (However, one subgrantee we visited regularly does extensive roofing work, a practice that has drawn criticism from DES monitors.)

3.4.2 Overall Patterns of Per-house Expenditures

Subgrantees operate under a \$1,600 average limit on per-house expenditures. As Fig. 6 (on the following page) shows, expenditures tend to cluster around this average more closely than the variability of the housing stock might lead one to expect.

DOE regulations require that subgrantees spend at least 40 percent of DOE funds on materials installed in weatherized units. The rule requires that projects achieve a 40:60 materials to labor and program support ratio as an average, not necessarily on every unit. (In section 4.6.4, we comment on how we believe this rule has affected the program adversely.) Our survey asked subgrantees to report materials expenditures with the results as shown in Fig. 7.

Fig. 6

***Distribution of Total Per-house Expenditures,
Based on Survey Data on Ten Most Recent Completions per Project***

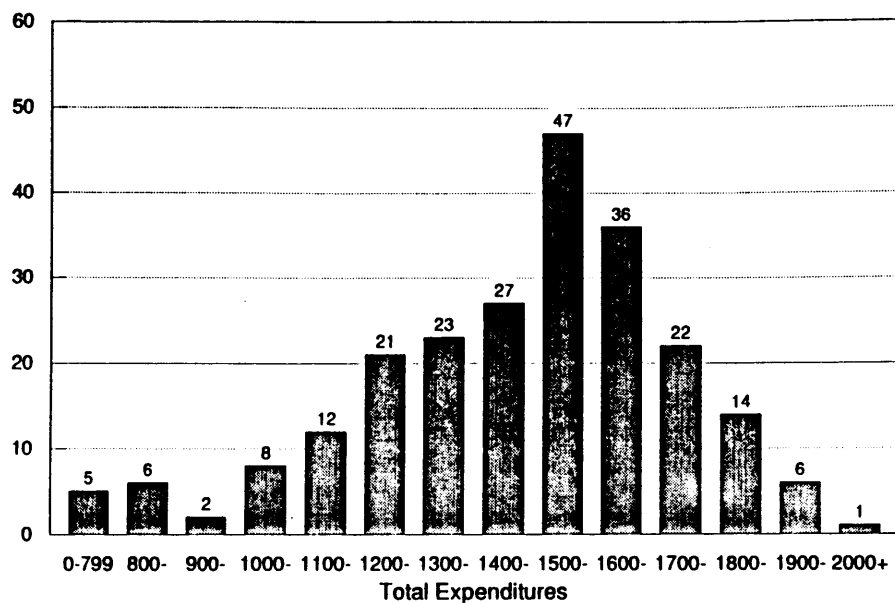
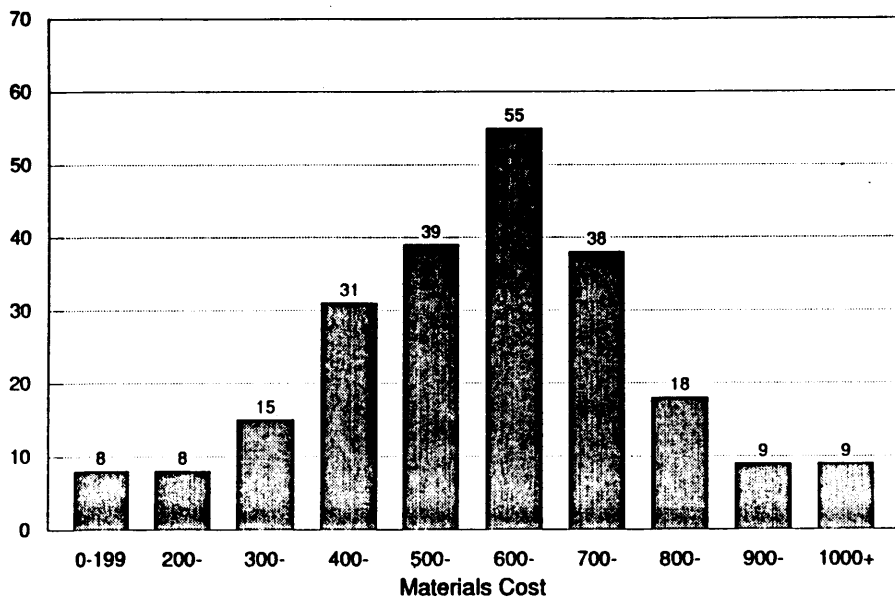


Fig. 7

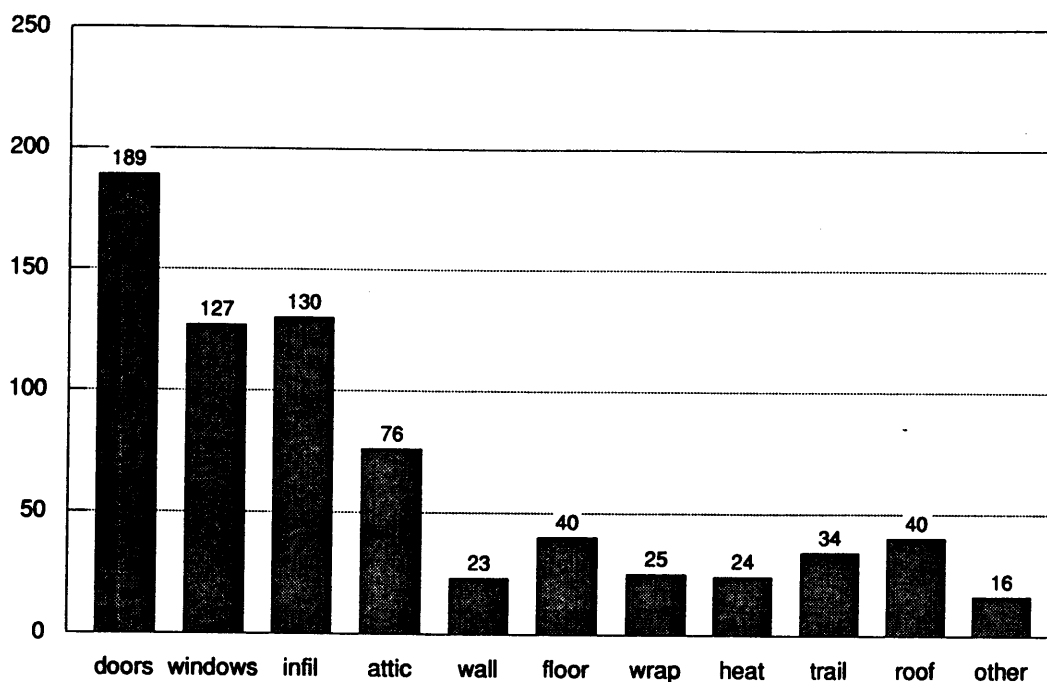
***Distribution of Per-house Expenditures on Materials,
Based on Survey Data on Ten Most Recent Completions per Project***



One result of the 40 percent rule is that projects track materials costs with great care. In our survey, we asked WAP coordinators to list every weatherization measure installed in the ten most recently completed units for which the materials cost was \$65 or more. (The \$65 figure was selected because it is almost exactly 10 percent of the average per-unit quota for materials costs.) The following pattern of expenditures emerged.

Fig. 8

*Measures with Materials Cost of \$65 or More Installed
on 240 Recently Completed Units*



As is evident from the figure, new doors were installed on 189 of 240 units (79 percent). Table 8, on the next page, shows the pattern is even more pronounced for mobile homes.

As the tables show, new doors are almost invariably installed. (This refers to replacing primary doors, not to adding storm doors.) DES guidelines state that this should be done if the existing unit cannot be made weathertight with incurring excessive labor costs.) Replacing some primary windows is also the rule, all of them on mobile homes when existing windows are of the jalousie type, which is often the case. Storm windows -- including insiders -- are rarely installed. The table below shows the survey results. Taken as a whole, the data show attic insulation installed in 46 percent of completed houses, with all mobile homes excluded from the computation.

Table 8
***Percentage of Doors and Windows Installed
by Type of Structure***

	Mobile Homes	Single Houses
Total in sample ¹	81	149
Units with new doors installed	71	110
% of all units	88%	74%
Number of new doors installed	137	172
Average # doors/installed unit	1.9	1.6
Units with new windows installed	59	63
% of all units	73%	78%
Number of new windows installed	505	230
Average # windows/installed unit	8.6	3.7

Table 9
***Percent of Completed Houses (Excludes Mobile Homes)
in Which Insulation Was Installed***

Number of houses in sample (22 agencies)	Insulation installed in:					
	Attic #	%	Walls #	%	Floor #	%
138	64	46	24	17	29	17

The averages mask considerable variation across projects. Some subgrantees insulate almost no attics; others manage, despite budget limitations, to insulate almost all of them. Six agencies accounted for 44 percent of all attics insulated. Seven agencies appear to be insulating fewer than one-third of their houses. (Because of the small number of houses in the sample drawn by some agencies, percentages should be taken with some caution.) Table 10 shows that data.

¹ The total is 230. Data by type of structure was not supplied by one respondent.

Table 10

*Frequency with Which Attic Insulation Is Installed
by WAP Subgrantees*

Fraction of homes	# agencies	# houses insulated	% of all houses	# attics insulated	% of all attics
2/3 +	6	37	27	28	44
$\leq 2/3, \geq 1/3$	9	55	40	27	42
<1/3	7	46	33	9	14
Total	22	138	100	64	100

Just over half the houses in this sample received attic insulation. We did not ask for pre-inspection sheets on these units, so cannot be sure how many of these houses already had adequate insulation, how many were judged impossible to insulate for technical reasons, and how many were omitted because no funds remained after installing replacement doors and windows. (Our impression from site interviews is that cost is the most important factor, existing insulation second, and technical problems a very distant third.)

Until recently, it was common for Kentucky subgrantees to install skirting (or "underpinning") around the base of mobile homes. The DES discourages the practice because there exists no technical evidence that underpinning -- although it has other merits -- saves energy. Nevertheless, our survey data indicates that underpinning costing \$65 or more was installed on 26 out of 210 units (or, more accurately) on 26 out of 78 mobile homes.

3.5 Monitoring and Training

Monitoring and training are the principal means by which state policies are communicated to subgrantees and influence subgrantee behavior. Although both are state-level functions, we have postponed this description until now because their impact occurs directly at the subgrantee level.

3.5.1 Monitoring

The DES monitoring program may fairly be described as aggressive. Monitors are expected to inspect a minimum of 15 percent of all completions (i.e., more than 700 houses and mobile homes a year at current completion levels). In addition, they also look at pre-inspected units for which work orders have been written but actual weatherization has not yet been begun. The frequency of monitoring

visits varies with the size of the agency. Although the DES target is three visits per year, this will not be achieved because of vacancies.

Monitors, of course, rely on the same RetroTech-based checklist as local inspectors, and their judgments provide subgrantees with the official DES interpretation of those guidelines. Monitoring reports are communicated orally on site and later in writing to subgrantee administrators.

DES provided us with the most recently available monitoring reports on the 12 subgrantees we visited. These reports deal with a variety of matters, but are heavily oriented toward "quality of work" comments on individual weatherization jobs. "Quality of work" in this context tends to mean craftsmanship by buildings trades standards -- i.e., the extent to which prescribed measures are correctly installed and the appearance of the finished job. Comments on overall patterns of work being done are rare, perhaps because most subgrantees do in fact attempt to follow DES priorities closely.

In our mail survey we asked: "Is there anything about the State monitoring procedures you would like to see changed? What and why?" Five of 22 respondents answered "no" or gave other responses indicating satisfaction. Eleven responded with various short criticisms and suggestions, the three most common of which dealt with the technical competence of monitors, the amount of time monitoring requires, and inconsistencies in judgments among different monitors. Six of 22 respondents left the question blank. The function of monitoring is always potentially adversarial and hence subject to friction. Based on impressions our evaluators received during site visits, relations between monitors and those being monitored are not markedly different from those we have observed in other states.

3.5.2 State Training

Training during recent years has been subcontracted to the Kentucky Association for Community Action (KACA). According to the State Plan, the grant for the recently completed program year totaled \$180,619. This supported four full-time professional positions (a coordinator and three trainers) and two part-time positions (research analyst and rehab coordinator).

In our mail survey, we asked weatherization coordinators: "Do you have any suggestions for improving training (e.g., subject matter, format, frequency)?" Nine of 22 respondents either left the space blank, said "no," or (in one case) stated that current training was "excellent." The remainder gave various responses, which the following two tend to cover: (1) "I think we need more field training and less . . . classroom training. To be kept up on all new technology." (2) "More frequent. Keep up to date on new subject matter. Keep more informed of new techniques etc. Need a newsletter from KACA on techniques and materials." Several respondents repeated the theme of wishing to learn new techniques; one called KACA training "repetitive"; another suggested that manufacturers of weatherization materials and equipment be invited to demonstrate how to use their products. During site visits, several coordinators commented that a considerable

amount of time at training sessions in the past had been used to interpret guidelines on priority measures and how to handle related paperwork. Almost everyone interviewed favored more "hands-on" training.

We should add that subgrantees may have interpreted our question variously, depending on their experience. Our site visits suggested that weatherization coordinators may count only hands-on training as "training," and will say that they have not received any "training" for long periods of time, even though they have attended "meetings."

3.6 Comments on WAP in Kentucky

In the preceding sections we have tried to describe with a minimum of commentary how WAP operates in Kentucky. In this section, we comment on our observations and explain our frame of reference for the recommendations that appear in Section 5.

Several caveats should be applied to all our comments. First, there are limitations to the methodology of this evaluation. Because neither time nor resources were available for before-and-after measurements of energy savings, we necessarily argue by inference rather than by measured results. Moreover, because different programs install different measures and employ different techniques, it is difficult to find well-designed studies whose results can be expected to be closely matched elsewhere.

Second, although the two evaluators who performed the field work and wrote this report have had extensive experience with both WAP and program evaluation, no one knows everything. We have tried to indicate which opinions we believe to be well supported by relevant studies and which are more nearly matters of personal judgment.

Third -- and this cannot be emphasized too strongly -- our criticisms should not be construed to reflect on the competence or dedication of the program administrators involved at either state or local levels. All public programs, WAP certainly included, operate in an environment that requires balancing many constraints, and we are aware that it is easier to offer advice than to act upon it.

3.6.1 Field Observations

Both of the two evaluators who did the field work for this study had visited several Kentucky WAP subgrantees some years earlier while assisting with another evaluation.¹ As a result, we feel able to offer some overall impressions about how the program has changed since that time.

¹ The previous visits were performed under a DOE contract and were essentially compliance-oriented. Neither evaluator returned to any subgrantee agency that he had visited under the earlier contract.

Considered as a whole, we believe that the WAP in Kentucky program has improved significantly. The DES has largely succeeded in imposing uniform standards on agencies that once were inclined to "do their own thing." Moreover, these standards (based on DOE RetroTech diagnostic procedures) are sensible within their limits. Some wasteful practices, notably installing underpinning on trailers, have been curtailed (although, as our survey data indicates, far from eliminated). The WAP State Plan, completed more than a year before this report, candidly identifies several of what we regard as the most serious remaining problems.

We are very impressed with administrative improvements -- notably the near-perfect clarity with which files permit tracking timelines and materials expenditures. (Well-maintained files do not in themselves mean that a program is productive, but badly maintained ones are often symptomatic of administrators who do not know what they are doing.) We were also impressed with the quality of workmanship -- meaning building trades technique -- on the houses and mobile homes we were shown.

We also have serious reservations. When we first observed it, the Kentucky program was largely decentralized. It has now been centralized. On balance, that represents an improvement. A negative side-effect, however, is that we received the distinct impression that many weatherization coordinators now rely on DES rules rather than thinking through problems. There are no incentives to experiment or try out new technical approaches to diverse local problems.

The most important of our comments and recommendations are variations on the theme that Kentucky has failed to take advantage of well-demonstrated advances in diagnostic technology. At the single most critical point in the weatherization process -- the point at which work orders are written up -- subgrantees rely on DOE/DES RetroTech formulas and guesswork instead of measurements of physical data. That fact (combined with a rule that requires 40 percent of subgrantee budgets to be spent on materials) encourages installation of measures that are unlikely to save as much energy as other, usually cheaper, measures that are often neglected. In practice, the Kentucky program is largely a "doors and windows" program. These are unlikely to be the most cost-effective energy-saving measures, at least not to the extent they are being installed.

3.6.2 Weatherization Diagnostics

The single most critical point in the WAP program is the on-site pre-inspection of a house or trailer. This pre-inspection leads to a work order, which determines what is or is not done to make that housing unit energy-efficient. We believe that this is the point at which the Kentucky program has the most room for improvement.

3.6.2.1. *Infiltration Diagnostics:* The greatest cause of physical discomfort and energy waste in residential buildings is unnecessary infiltration of cold outside

air into the warm building interior and exfiltration of warm inside air to the out-of-doors. The most powerful force that drives infiltration is due to the "stack effect." Stack effect infiltration is a function of two variables:

- 1) the difference in temperature between outside and indoors; and
- 2) the height of the column of air, e.g., the distance from the basement to the attic.

In general, air is pulled in at the lower portion of the house and expelled through upper portions. Accordingly, in the absence of other infiltration forces, there is a neutral pressure plane approximately half way between the basement and attic of a dwelling, unless there are other forces to cause either infiltration or exfiltration. Further, in areas immediately above or below the neutral pressure plane, infiltration and exfiltration forces tend to be quite weak.¹

To be sure, other infiltration forces affect the basic picture. Wind tends to tilt the neutral pressure plane, and heating systems which draw air from throughout the dwelling and expel it through a flue tend to raise the neutral pressure plane. However, in general, strong infiltration forces are always on the lower portions of dwellings, and strong exfiltration forces are always on the upper portions.

A number of inferences may be drawn from this:

- Curing infiltration and exfiltration problems in homes needs to be accomplished primarily in the attic and the basement, not in between. Although obvious cases of significant leakage areas should be cured whenever they occur, the wholesale replacement of windows and doors -- the most common weatherization measures current employed in Kentucky -- should be the exception, not the rule, in dealing with air leakage.
- Finding air leakage areas is not easy, particularly if those looking for them are not accustomed to exploring various nooks and crannies in basements, crawl spaces, and dirty attics. However, the process is helped immeasurably by: 1) knowledge of recent discoveries by building scientists concerning the diverse paths that infiltration can take, and 2) using a blower door.² A blower door makes finding holes in the heated envelope much easier to spot. When garage mechanics check an inner tube for leaks, they inflate it, plunge it into a tank of water, and look for the bubbles. A blower door operates on

¹ This concept is supported by Canadian literature, the Lawrence Berkeley Laboratory, Princeton University, etc. Details can be found in the Minneapolis Blower Door Memorandum, May 15, 1988.

² "Integrating Analytical Tactics into New York State's Weatherization Assistance Program: Project Findings," a paper presented at the Third International Conference on Energy Conservation Program Evaluation, August 1987.

a similar principle, and failure to use one in locating infiltration problems is like staring at a dry, uninflated innertube in hopes of discovering if the problem is a puncture or a leaky valve stem.

- The cost-effective approach to infiltration reduction is to plug air leaks wherever they exist. A corollary is that crews should not waste time on leaks that do not exist. This principle applies even to caulking and weatherstripping, items for which materials costs are low, but for which labor costs can be high. At present, subgrantee work orders routinely read: "Caulk around all windows." There are two problems with this directive. First, it is labor-intensive, imbalancing the materials-cost/labor-cost ratio so troublesome to Kentucky subgrantees. Second, it is almost pointless, except for cosmetic purposes, if the main sources of infiltration are elsewhere. According to Canadian literature, infiltration associated with doors and windows rarely exceeds 15 percent of a house's total infiltration. In Toronto, for example, air change losses due to ventilation, leaks in walls, and leaks around the basement and foundation areas together accounted for over 80 percent of total infiltration in a sample of houses studied. Ceiling leaks, on the average, accounted for another nine percent. Leaks around windows contributed eight percent, and leaks around doors only one percent.¹ Although Kentucky doors and windows may be leakier than those in the Kentucky sample, the chances are good that other parts of Kentucky houses are also leakier, so that the common sense rule of "worst first" would remain valid.²
- Air sealing should be accomplished on the inside of the building. There are a variety of new techniques and sealants that have appeared on the market in the last decade, including various foams and caulks which are environmentally benign, retain flexibility after curing, are aesthetically pleasing (or at least neutral), and are typically warranted by their manufacturers for 30 years or more.
- Blowing cellulose in walls and ceilings contributes importantly to lower convective losses in homes. Conventional wisdom is that infiltration from heated areas into attics and basements should be sealed off as carefully as possible before installing attic insulation, but walls should be blown before air sealing. Blowing walls as tightly as possible both helps to solve infiltration problems and diminishes potential moisture problems. Although insulation thus installed can

¹ Air Sealing Homes for Energy Conservation," Buildings Energy Technology Transfer Program, Canadian Resources Council, Department of Energy, Mines and Resources, Canada, 1984, esp. page 2-17.

²Training materials expanding on these principles may be found in "Setting Priorities and Limits," Synertech Technical Note 89-507, prepared for the New Jersey Weatherization Assistance Program, Synertech Systems Corporation, Syracuse NY, March 1989.

be a major contributing factor in lowering both convective and conductive losses, our survey of weatherization operations indicates that attic insulation is currently installed in only 46 percent of houses weatherized, and sidewall insulation in only 17 percent. (See Fig. 8.) It is nonetheless clear that there is heavy emphasis on the installation of visible weatherization measures such as windows and doors, at the expense of more effective energy conservation measures, such as air sealing and attic and wall insulation, which are known to provide better energy savings per weatherization dollar.

- Successive blower door readings taken during the weatherization process (more precisely, during that portion of the process aimed at reducing infiltration) tell a crew when to stop. This not only may save time and money, but may prevent crews from sealing houses too tightly for the health of their occupants. (Over-tightening is seldom a real problem with houses, particularly those dealt with by WAP, but may sometimes be a problem with trailers.)
- Mobile home retrofitting can also be enhanced by using diagnostic equipment to aid in identifying problems. Research in New York, Illinois, Arizona, and elsewhere,¹ indicates that a considerable amount of air infiltration comes via heating ducts in mobile homes. The ducts were either not well attached during manufacture, suffered damage during transport, or both; in any event, blower doors often reveal the presence of large leakage areas which open to the external world via the trailers' belly boards. The result is not only substantial air infiltration losses, but a greatly lowered seasonal efficiency of the mobile homes' heating system. In these cases, blower doors are useful in pinpointing the problem areas.

Incidentally, one of the respondents to the "Program Suggestions" portion of the survey (see Appendix D) maintained that "insulating trailer floors is unreasonable because of removing belly boards." In fact, many weatherization operators in other states remove the fascia board, drill three-inch holes, and blow fiberglass into the mobile homes' belly boards with the aid of a 30-foot long, two-inch diameter PVC pipe. This is clearly an area where enhanced training and technical assistance would be of use.

The retail cost of blower doors suitable for use by weatherization projects ranges between \$1,400 and \$2,500 -- roughly the cost of one completion. No doubt, substantial economies could be achieved by a bulk purchase. Blower doors require a fairly substantial investment in training time to learn to use well. Once their use has been mastered, however, set-up time is approximately 20 minutes for one person, according to WAP professionals in other states. These individuals

¹ Laurence F. Kinney et al., "HIECA and Mobile Homes: Special Considerations for Special Housing Stock," Final Technical Report prepared for the New York State Department of Public Service, April 1988.

further estimate that set-up, a full course of readings throughout a working day, and disassembly time require, at most, an hour altogether.

They add that this time is more than offset by what they do not do -- e.g., caulk outside seams that have no significant effect on infiltration. These estimates assume that major infiltration-stopping is done between readings -- i.e., that the functions of pre-inspection initial infiltration-stopping are combined, rather than done in two trips, as is now the case. Naturally, items that require measurement and special orders (principally windows) and insulation must be delayed until orders can be filled, just as they are now.

In short, our primary technical recommendations have to do with the type of improvements that are being made, and the reasons that such improvements are selected. It is easier, more obvious, and probably more pleasant and more politic to fix the house from the visible exterior. The neighbors can see the results, the crews spend less time working under difficult conditions. Outside work on the main floor of a house or trailer is clearly preferable from many standpoints -- but energy savings is not one of them.

In order to better diagnose and understand what improvements will result in the greatest savings, weatherization crews need training and equipment that they presently lack. Weatherization is not the same as home improvement; those individuals who have shown excellent skills in basic home repair do not necessarily know state-of-the-art techniques in reducing the number of air changes per hour (ACH, the standard measurement of air infiltration and exfiltration). Equipment -- primarily a blower door and infrared scanners -- is critical, and with the improved equipment must come training in how to 1) diagnose, and 2) correct such infiltration. These are the keys to improving the current WAP program in Kentucky.

The DES has expressed an intention to make greater use of blower doors, and KACA has conducted some training in their use. So far, nothing much has happened. The habits (and client expectations) created by installing so many new doors and windows will be hard to change, even with considerable effort.

One of our recommendations will be that training personnel be adequate equipped in and fully conversant with new technological aids in weatherization diagnostics. We agree with the comments of many subgrantees that there should be more frequent hands-on training at the local level -- and perhaps at the job site -- rather than is currently the case. If appropriate, WAP may wish to contract with other firms in these technologies to develop "train the trainers"-type workshops, in which trainers are instructed in how to teach the actual crews about infiltration-reduction methods.

Most coordinators we interviewed expressed great interest in improving diagnostics, but one local weatherization coordinator, in response to a survey question, wrote: "I am somewhat concerned about the eventual use of the high tech blower door... The decision to install new doors, windows, storm windows, or even skirting mobile homes should be made by first-hand intellect rather than a machine calculation."

A check of this subgrantee's survey questionnaire revealed that its crews of this subgrantee had, on their agency's ten most recent completions, installed 17 replacement doors -- one on each of three units, and two on each of the remaining seven. The range of materials costs on these ten units was the narrowest of any agency's, from a low of \$589 to a high of \$682. This represented a spread of only \$50 on either side of the required statewide average (i.e., 40 percent of \$1600 equals \$640). This degree of uniformity was the more remarkable since none of the ten units was a mobile home. (In the City of Louisville, whose sample also included only houses, materials costs ranged from \$397 to \$744.) Moreover, the subgrantee quoted had insulated the attics of only three of the ten houses, but added floor insulation to two of those three. The appearance of the data suggest that decisions involve hitting a predetermined budget target more than applying real judgment.

No technology is a panacea, and blower doors have their limitations. At any meeting of weatherization professionals, one can hear lively arguments on the advantages and disadvantages of particular techniques -- e.g., on whether reliable readings can be obtained on extremely windy days. One never hears of anyone abandoning their use.

The WAP program in Virginia began about two years ago to require their use statewide and, despite some resistance, essentially forced a blower door on every subgrantee. According to a state spokesperson, in about three months, the state WAP office received a barrage of complaints -- for not buying enough blower doors to equip every crew.

3.6.2.2 Heating System Diagnostics: Although the DES State Plan indicates an intention to do more to promote heating system work, not much progress appears to have been made on this measure. Proper training will be especially critical here, for obvious safety reasons. Yet there is increasing evidence to show that heating system work is cost-effective.

Training is somewhat complicated by the wide diversity of heating sources within the state, and even within the service area of individual subgrantees. For example, the predominate fuel source, natural gas, accounted for less than 25 percent of all primary fuel types. Only two subgrantees showed all ten recent completions as being of the same fuel type (one was natural gas and the other kerosene), while most subgrantees worked on facilities of between four and six different fuel types.

3.6.2.3 Conduction-loss Diagnostics: An infrared scanner is like a camera, except that it detects radiation in the infrared (heat) portion of the spectrum, rather than visible light. The most useful models come with a two-dimensional video-like display, so that the operator can see on screen what the scanner "sees" in the house. They are used either alone to identify "hot spots" -- e.g., those caused by gaps in insulation -- or in conjunction with blower doors to identify currents of warm air moving through walls or roofs.

The principal disadvantage of infrared scanners is that highly sensitive, easy-to-use models are prohibitively expensive for routine use by weatherization subgrantees. Costs of sophisticated models begin around \$14,000. (Hand-held, single-axis scanners costing only a few hundred dollars are available, but they give less usable information.)

For WAP at the state level, the best approach to infrared scanner may be to buy one of the best models and use it for training in conjunction with a blower door. If this option is election, an infrared scanner that records on videotape should be chosen, since it would be more useful in training. According to weatherization professionals, the experience of watching streams and rivulets of heat move through walls, around light fixtures, and through leaky ducts enhances crew training by sensitizing them to how houses work as systems.

3.6.2.4 "No-tech" Diagnostics (Fuel Bills): None of the subgrantee inspectors with whom we spoke make a practice of reviewing client heating bills for a full heating season. Generally speaking, no attempt is made even to collect this information. ("Percent of income spent on fuel" is one factor in determining client eligibility, but it is estimated in an unsystematic manner by intake personnel.)

Failing to analyze fuel bills is an important omission because the absolute size of a pre-weatherization fuel bill per square foot of floor space is one of the most reliable predictors of the magnitude of potential savings. This is little more than common sense. Even ignoring such important factors as number of occupants and their lifestyle, the odds are that weatherization will save more from a \$800-per-year heating bill than it will from a \$300-per-year-bill -- simply because it is likely that more of that \$800 is being spent on wasted heat.¹

Published reports often obscure this point by estimating energy savings as percentages of what fuel bills would have been in the absence of weatherization. There is nothing wrong with this, but what counts are not percentages but Btu's and dollars saved. The program will show a better overall return on investment by saving 15 percent of \$800 fuel bills than by saving 20 percent of \$300 fuel bills. In fact, greater savings can be achieved on units with high fuel costs.

This rule of thumb is not easy to apply. In homes not heated by metered fuels, clients often have little idea of how much they actually pay. In some rural areas, wood or coal may be available for the labor of collecting it. It would be a mistake to burden subgrantees with making artificial estimates of fuel use on every house; it is a greater mistake not to make use of fuel consumption data when it is available.

¹ Synertech Systems Corporation, Integrating Analytical Tactics into New York State's Weatherization Assistance Program: Project Findings (NYSERDA Report 87-21, prepared for NYSERDA and NYS Department of State, 1987).

3.6.3 A Question of Mindset: Equity vs. Efficiency

We wish to make explicit a set of assumptions that are implicit throughout the preceding discussion: that the low-income clients of WAP (and the taxpayers of Kentucky) would be better served if subgrantees reoriented their thinking about what is "fair" to individual clients.

In section 3.4.2 (figures 3.9 and 3.10), we noted how closely per-unit expenditures cluster around the \$1,600 average value. The majority of weatherization supervisors we talked to felt, to some degree or other, that "fairness" requires spending approximately the same amount on every household that receives any work at all. Some of them felt it strongly, in effect treating WAP as a home-improvement program in which the benefits are new doors, rather than as an energy conservation in which the benefits are a stream of savings on fuel bills. Naturally, most coordinators hope, and probably believe, that they are giving clients both kinds of benefits. But at least one director, in response to a hypothetical question, insisted to our interviewer that he should spend as close as possible to \$1,600 to save a client \$100 a year, even if he knew that he could capture \$90 of that savings by spending only \$800.

As extreme as that position is (and contrary to all DOE/DES guidelines), it is powerfully enforced by client demand. Applicants see that a neighbor's house received new windows (or a neighbor's trailer received skirting); they want the same thing for themselves and may bring political pressure to bear to get it. As long as subgrantees install highly visible improvements (and, lacking actual measures of infiltration, justify them as "top priority" by DOE/DES guidelines), this pressure will continue.

WAP is an energy conservation program that also succeeds as an anti-poverty program if and only if significant energy savings materialize. In the case of WAP, "fairness" consists in trying to maximize total energy savings for as many households as possible. No one household, simply by having met program eligibility standards, is automatically entitled to any particular level of expenditure. Our view is that the mindset of many WAP subgrantees makes about as much sense as that of a doctor who routinely removes patients' gallbladders because they are "entitled" to have them removed under Medicare.

3.6.4 The Administrative Rule that Drives the Program: "40 Percent on Materials"

DOE regulations require that at least 40 percent of DOE funds be spent on materials installed in weatherized units -- not unit-by-unit, but as an average. (As noted earlier, all funds used for weatherization in Kentucky are treated as if they were DOE funds, so the "40-percent rule" is applied to the average of all units.) Although this 40 percent is an average, that fact does not offer subgrantees much flexibility because many weatherization measures are labor-intensive. It is fairly easy to spend a total of \$500 on one house and \$2,000 on another; it is harder to spend (sensibly) more than 50 percent of a unit budget on materials alone.

The 40-percent rule was promulgated to counter a nationwide tendency of WAP projects to view themselves largely as public employment programs, rather than energy conservation programs. This viewpoint was partly a carryover from a period when CETA labor was seen (erroneously, of course) as "free"; there may also have been a general tendency on the part of CAAs to place labor efficiency low on their list of priorities. In any case, DOE's response was to require that expenditures on materials comprise at least 40 percent of the average per-house costs, on the theory that this would make it more likely that clients, not subgrantee employees, would capture most of the benefits of the program.

We believe that the 40-percent rule, more than any other single regulation, has shaped the nature of the program in Kentucky. We think that it accounts in significant part for the program's heavy emphasis on replacing windows and doors.¹

Having heard arguments defending current practices, we note that the need to spend 40 percent of the average per-house budget on materials surfaced again and again in interviews with WAP coordinators. Their main concern about adopting blower doors might be paraphrased: "How will we meet our materials spending quotas if it proves that most of what a mobile home needs is work on the heating system, duct tape, foam, and strategically placed insulation?" When they talked about the "labor" requirements of blower doors, they meant two things: (a) their perceptions of operating requirements for the technology and (b) that blower doors might indicate giving higher priority to filling hard-to-reach holes than to easy-to-reach windows.

The first perception is not likely to be a problem in practice; the second one will be. Many windows and doors will still need to be replaced, and that will often be more cost-effective than repairing them. Nevertheless, the overall tendency will be toward other measures. Subgrantees will save labor time by omitting much caulking now done routinely, but the final balance is impossible to predict. By omitting some pointless "infiltration" work, they should have more money for insulation, but cellulose is cheap, especially for projects that buy in bulk. Meeting the 40-percent standard will remain a problem.

In our opinion, the DES has more flexibility in this area than it has so far chosen to exercise. LIHEAP funds are not governed by the 40 percent rule. DES has chosen to put all funds into one pool, which reduces accounting burdens on local subgrantees and avoids the anomaly of reporting some "DOE houses" and other "LIHEAP" houses. We believe that other options are available. For example, DES could give some or all subgrantees the option of charging some kinds of labor-intensive work to LIHEAP on all completions, up to the percentage represented by LIHEAP funds. Further, Kentucky has not taken advantage of the

¹ State WAP directors, at their 1988 annual meeting, adopted a resolution urging that the rule be modified. At least four bills have been introduced in the House and Senate to do this, subject to the condition that states adopt sufficiently rigorous energy audit procedures.

flexibility provided by the PVE funds, which allow for "weatherization-type" programs which are very similar -- but not identical to nor governed by the strict DOE regulations -- as the current WAP program now in place.

We think that DES has traded off too much in the way of flexibility for gains in administrative simplicity. We admit to uncertainty over the best approach. Because of the history of the rule -- subgrantees' tendency to overspend on labor -- DES has been correct to hold a firm line in the absence of performance-oriented standards. In general, as long as managers have no way of measuring program outputs, they have little choice but to place strict controls on program inputs. If results can be measured, however, senior managers can afford to give lower-level managers more discretion. We believe that this is the point at which the Kentucky program now finds itself.

3.6.5 Comments on Overhead

The impression we gained from field visits was that subgrantees are not as sensitive to overhead costs as the importance of these costs warrants. State officials say that they monitor overhead closely, but communication problems apparently exist. One coordinator -- whose thoughtful responses to other questions made his assertion plausible -- clearly stated that a DES monitor had advised him to increase a low overhead figure simply to bring it closer to the state average. (The coordinator indicated that he complied by discontinuing his previous practice of charging pre-inspection visits on a house-by-house basis. He felt that this paper change did nothing but obscure economies his program had achieved in other areas.) In this instance, the state supervisor said that either the monitor had given bad advice or what he had said has been misunderstood. Since either explanation is likely enough, we mention the incident only because other coordinators implied that accounting for overhead costs (especially the indirect labor component) was essentially arbitrary.

As explained to us by state officials, the intentions were far from arbitrary and reflected something that struck our evaluators strongly: that overhead estimates need to be readjusted at regular intervals -- monthly for large projects and at least quarterly for all of them. Using a single average estimate of per-house overhead all year long apparently suggests to some subgrantee personnel that this "cost" is incurred as soon as a dwelling unit is approved for work. We received the impression that this mindset was acting as a disincentive to weatherize more houses, when the facts point to the opposite conclusion. The more houses weatherized, the lower the average overhead.

In some instances, absolute reductions in overhead costs may be possible, not just lower percentages. One weatherization coordinator told us that not filling a vacant supervisory position had cost his program nothing in productivity. We had hoped -- by inquiring in our mail survey about staffing -- to get a clearer picture of the relationship of supervisory positions to average "program support" costs, but no useful patterns emerged.

3.6.6 Crews vs. Contractors

The question of the relative merits of crews vs. contractors was raised during early discussions of issues to be pursued during this study. We do not believe that either mode of operation is inherently superior to the other.

Advocates of crews point to the absence of any need to budget for contractor profit and insist that their workers are more dedicated. Advocates of contractors point to their ability to avoid many personnel management problems and the flexibility to expand or contract operations without incurring high overhead costs. As a national pattern, we believe that most urban programs now rely mainly on contractors, while most rural ones are still crew-based. Given the difference in labor problems between most rural and urban areas, that is what one would expect.

We think that this decision is properly a local one and should depend on several factors: cost and quality of labor, availability of inexpensive warehouse space, program stability, existence of enough contractors to provide a competitive market, and so on.

One point specific to Kentucky: we regard the mixed model exemplified by the Louisville program (which, in effect, uses program-managed crews for miscellaneous infiltration work and contractors for everything else) as a rational one. It uses lower-paid, in-house employees (in its case, Project WARM employees and volunteers) for a multitude of small tasks that can be difficult to define unambiguously on a work order. This does not mean that the Louisville model should be copied slavishly. It does, however, seem sensible to use low-cost labor for labor-intensive jobs and to contract out work that requires specialized equipment or training and whose completions can be readily checked by visual inspection.

It might be worth adding that some urban projects in other states have gone farther. A weatherization project in Philadelphia relies on contractors for all work and requires them to buy and use blower doors, offering free blower-door training as an incentive. Infiltration performance standards are based on reducing the number of air changes per hour, verified by the project with its blower door.¹

3.6.7 Kentucky's 15 Percent Ceiling on Rental Units

If tenants living in rental properties are eligible for WAP, DOE regulations require only that landlords agree not to increase rents as a result of weatherization improvements. The national policy is based on two considerations: (1) that energy savings are energy savings, wherever they occur and (2) that renters are, on the whole, poorer than homeowners and hence in greatest need of economic assistance. (The data presented in Section 2.3 show this to be also true for Kentucky.) Although the State Plan shows that approximately 45 percent of eligible house-

¹ Source: Telephone conversation with Michael Blasnik, Director of Project GRASP, 3500 Lancaster Ave., Philadelphia, PA 19104, 215-222-0318.

holds are renters, Kentucky requires that no more than 15 percent of the dwelling units weatherized statewide be rental units, a requirement passed through to subgrantees (although waivers are possible).

Most local coordinators seem satisfied with existing limits. Except for the City of Louisville, which is now having difficulty identifying enough owner-occupied houses to weatherize, we encountered few coordinators eager for relief on the 15 percent ceiling. Of 24 respondents to our questionnaire, four would prefer to weatherize fewer rental units, 11 would weatherize about the same number, and nine would weatherize more.

The value judgments underlying this policy are easy to understand and sympathize with. No one wishes to give windfall benefits in the form of improved property values to landlords who could, in many instances, afford to spend their own money for improvements. It is, however, tenants who continue to suffer. Tenants are, of course, eligible for assistance on LIHEAP, which goes to fuel vendors, not to landlords. However, one WAP director commented on the diligence with which some landlords hustled their tenants down to the LIHEAP offices, so that they would not spend "rent money" on fuel.

A subsidy need not be direct to be real. A plausible case can be made that an energy conservation approach is less likely to provide windfall benefits to landlords than an energy assistance approach. The current reliance on cash subsidies to assist needy tenants increases the odds that landlords will get a cash guarantee up front, rather than the deferred (and problematic) benefit of enhanced property value.

Finally, the 15 percent ceiling on rental units is the largest single barrier to WAP's serving more LIHEAP clients. Whatever the decision on the appropriate no of rental units to be served, policymakers should be aware that they cannot have it both ways. They cannot simultaneously expect WAP to relieve or reduce the need for income transfer, while writing regulations that sharply reduce the eligibility of LIHEAP clients for WAP services.

The case for equal treatment of tenant-occupied and owner-occupied housing would be very strong if subgrantees manage to break the current pattern of spending nearly \$1600 on each weatherized unit, without regard to energy-consumption patterns. In fact, installing new doors and new windows does improve the market value of property. (It also increases the estate value of sound housing given top priority because of the extreme age of its occupants. Such housing seems unlikely to be inherited by low-income families and certainly will not be affordable by such families when placed on the market.) Moving toward performance-based standards that minimize infiltration and provide more nearly "invisible" improvements may provide an opportunity to reconsider the entire "windfall" issue.

3.7 Estimating Energy Savings

Q. How much energy does weatherization save?

A. "I was glad to be able to answer promptly. I said I didn't know." -- Mark Twain, Life on the Mississippi.

Q. What would we need to know in order to give an answer as clear as Mark Twain's, but more quantitative?

A. Quite a bit, but minimally before-and-after fuel consumption on a large sample of houses, collected across two full heating seasons, compared to that of a control group.

The ideal evaluation of the WAP program would be something like the following. The evaluators would identify a large (probably several hundred) random sample of houses for which accurate energy-use data was available across a full heating season (roughly, October - March). They would know a lot about the physical characteristics of the houses: e.g., square footage and how many were mobile homes. These houses would be weatherized during the non-heating season (April - September), and their fuel consumption carefully measured during the following year. Their occupants would use no supplementary heating sources, such as wood stoves or kerosene heaters. The occupancy of the houses would not change over the two heating seasons (i.e., no one would move in or out) and the same number of rooms would be heated during both periods. The average temperature would be the same during both years, and there would be no major external economic shocks to cause occupants to change their spending patterns -- e.g., no sudden increase or decrease in fuel prices, no major change in the unemployment rates. Naturally, the evaluators would also know that each house was being weatherized according to identical standards.

In practice, all of these conditions can seldom, if ever, be met. Often very few of them are. Some, like weather, are fairly easy to adjust for analytically. The effect of external shocks, like fuel price changes, can be guessed at by use of control groups consisting of households eligible for WAP (and hence like actual recipients in all known respects). However, getting accurate fuel-use data is difficult at best and often impossible except for metered fuels like natural gas and electricity. Evaluators seldom know as much as they would like to know about wood stoves, kerosene heaters, or electric space heaters; they seldom know anything about changes in household composition or lifestyles. (Often the occupants do not know either; memories vary about thermostat settings, or when a room was opened or closed off.)

Having said all this, it is not surprising that carefully done studies of WAP and weatherization programs resembling WAP have produced widely varying results.

We examined two studies of the WAP program in Kentucky, one done in 1980 by the University of Louisville for the Kentucky Association for Community

Action¹, the second by the Financial Management and Evaluation Division, DES, in 1983.²

The University of Louisville study found that median fuel reduction for households using metered fuels was eight percent.³ (Note that this statistic is a median, meaning that energy savings were higher in half the homes in the sample, lower in the other half.) The comparisons were based on two heating seasons, 1978-79 and 1979-80. The evaluators commented also on the low degree of standardization of weatherization procedures.

Although the local agencies need help from administrative organizations at higher levels, they do not get it. Instead, the agencies are left to develop their own program structures and operations through trial and error.⁴

Even after the serious analysis was confined only to houses using metered fuels, the University of Louisville evaluators noted what most other studies have found: wide variations from house to house. In this instance the variations were astonishing: a range from a 69 percent decrease in energy use to a 48 percent increase. There is no reason to believe that any changes of this magnitude, positive or negative, can be attributed to weatherization, but it apparently was not possible to investigate what might have caused them.⁵

The DES study attempted to compare changes in fuel use from January, 1981 (before weatherization) to January, 1982 (after weatherization) in a sample of 132 homes using gas and electricity. We were unable to find an estimate of fuel

¹ David N. Allen et al, A Report on the Impact of the Weatherization Program in Kentucky, Consortium for Policy Research, University of Louisville, 1980. [Hereafter, "University of Louisville study.]"

² Financial Management and Evaluation Division, DES/CHR, Weatherization Fuel Reduction and Economic Impact Study, Frankfort, 1983. [Hereafter, "DES study."]

³ Estimated savings in homes using coal and wood were much higher (27 percent), but the evaluators regarded this statistic as doubly unreliable, being based on few or no written records and such estimates as were provided coming mostly from people connected with the local programs.

⁴ Ibid., p. 86. As noted in section 3.6.1 the two evaluators used by Pendragon found the same conditions still prevailing a few years after the University of Louisville study, a situation that is no longer the case.

⁵ Increases in energy consumption after weatherization are generally assumed to be due to changes in occupancy or in the behavior of existing occupants (e.g., opening up a previously closed-off room). However, it is possible (though unlikely) that the wrong choice of weatherization measures may make a house or trailer less energy-efficient.

savings, but the report states that dollar savings occurred in 74 percent of the homes weatherized and that zero savings or dollar losses occurred in 26 percent. Both savings and losses were generally small. The average dollar savings appeared to be about \$20 (depressed in part by a nearly 20 percent rise in average fuel prices). Savings for almost all homes in the sample (111 of 132) clustered in the plus-\$50 to minus-\$50 range. In general, we found the results somewhat hard to interpret, but it seemed fairly clear that average savings in energy were positive but not impressive.

Studies from other states show a more meaningful picture of (a) what is possible and (b) what is usually achieved.

One of the best-designed studies is that of the Michigan WAP program.¹ That study, involving a sample of more than 650 homes weatherized during 1983 found average gross savings of 14.9 percent from the "regular" weatherization program and 9.2 from a "reduced cost" program.²

These results cannot be assumed to apply to Kentucky, however. First, "regular" weatherization involved adding ceiling insulation to R-33 (R-38 in northern Michigan), and the "reduced cost" program added insulation to R-19. The latter figure is the Kentucky standard, and, as noted previously, our sample suggests that it is achieved for only about half the houses weatherized and virtually never for mobile homes.

The U.S. Department of Energy is currently contracting with the Meridian Corporation (Alexandria, VA) to compare the results of 30 studies of WAP and similar weatherization programs.³ These include one national evaluation of WAP, 14 state evaluations, seven evaluations of other comprehensive weatherization programs, and eight evaluations of specific weatherization measures.

Making comparisons across projects or across states is tricky because it is not always possible to know what measures are comparable. For example, for Project A "stopping infiltration" means caulking and weatherstripping; for Project B it means replacing a dozen or so doors and windows. As was to be expected, the reviewers found differing estimates of savings. The national evaluation reported gross average savings of 10.4 percent. The seven state WAP evaluations reported averages of 13 percent; the seven other evaluations of comprehensive non-WAP

¹ Martin Kushler and Patti Witte, Energy Administration, Michigan Department of Commerce, A Study of Weatherization Service Alternatives in Michigan (March, 1985).

² In this study, houses in a control group showed increased fuel usage of two to 5.7 percent, suggesting that net savings were actually higher.

³ Meridian Corporation, Weatherization Evaluation Findings: A Comparative Analysis, DRAFT, August 31, 1988. All references are to a working draft supply courtesy of the Office of Weatherization Assistance Programs, DOE. The final report may differ in some respects from this draft.

programs reported gross savings of 17.7 percent. (Some of these, however, involved more comprehensive measures than are installed under WAP -- e.g., spending levels as high as \$4,000 per house, in one instance.)

Perhaps most interesting were savings estimates from a subset of nine studies that met three criteria of methodological rigor: (a) a sample of 200 or more weatherized dwellings, (b) a comparison group of unweatherized households, and (c) data monitored for one year before and one year after weatherization. These studies all appeared in the 1984-1987 time period; four were of state WAP programs and five of comprehensive programs resembling WAP but often including other features. Average gross savings were 13.7 percent (net 12.4 percent after adjusting for lower energy consumption also occurring in the control groups) and median gross savings of 12 percent (net, 11.2 percent). Even within this subset of well-designed studies, the reported net savings range was appreciable -- from 9.5 to 20.5 percent.¹

Finally, the data seemed to show that savings are most strongly correlated with furnace replacements (expensive), furnace retrofits, attic and sidewall insulation together, sidewall insulation -- in that order. (These measures are not usually installed in Kentucky.) General infiltration reduction (which is standard in Kentucky) and attic insulation came next.² Generally speaking, payback periods on mobile homes were about twice that for single-family dwellings. Indeed, with two exceptions, energy savings associated with weatherizing mobile homes have been especially disappointing: -0.3 percent (Illinois), 3.9 percent (Michigan), 4.1 percent (New Hampshire), 5.2 percent (Wisconsin), 11.6 percent (Ohio), and 13 percent (Hood River, Oregon).³

The preceding discussion summarizes about as much as anyone knows about average savings from WAP. Three broad conclusions stand out:

- The most carefully designed and conducted studies have reported savings in the 10-20 percent range.
- Average savings for mobile homes using techniques roughly comparable to those used in Kentucky tend to be about half the magnitude of those for houses.
- Savings tend to be most strongly correlated with a combination of measures that include attic and sidewall insulation in addition to

¹ Ibid., pp. 24-5.

² Ibid., p. 21.

³ Ibid., p. 22 and Appendix A. The Michigan, Wisconsin, and Hood River studies were among the nine "well designed" studies. The other two were not. The Hood River project, however, involved much more extensive work than is normally done under WAP, with costs per mobile homes averaging \$2,350.

general infiltration reduction. (General infiltration-reduction, in the absence of other measures, is a "best buy" only if it is cheap.)

Based on what we know about the Kentucky program, we would expect overall savings to cluster near the lower end of the range reported in the best-designed studies -- or perhaps below it, both because of the number of mobile homes weatherized and because of a tendency to put most materials money into windows and doors at the expense of attic and sidewall insulation. (The prevalence of mobile homes is not within the control of the program, of course -- but techniques for weatherizing them are.)

In the last analysis, studies of average savings, especially when expressed in average percentage terms, are not as important to program managers as studies that give some clue on how to improve the averages. For example, a savings of 10 percent in a house that is already energy-efficient may mean very little in either dollar terms to the client or energy savings to the Commonwealth or nation. (I.e., any percent savings of a large number is better than the same percent of a small number.) In fact, wasteful houses have a potential for much larger savings than do tight ones.

A study by Synertech Systems for the New York State Energy Research and Development Authority measured before-and-after savings in a sample of approximately 100 homes in upstate New York counties. The results were grouped into quartiles, both by infiltration as measured with a blower door and by prior fuel consumption. Those in the quartile with the highest pre-weatherization fuel consumption were tightened, on average, 32.2 percent. Those in the quartile with the lowest pre-weatherization fuel consumption were tightened 30.5 percent, not a significant difference. But the percentage in fuel savings was striking -- 28.7 percent compared to 15.9 percent. The absolute difference in MMBtu's saved was more striking: 50.7 MMBtu for the quartile containing the houses that had been most wasteful, compared to 11.2 for the quartile that had been most efficient prior to weatherization.¹

As the Synertech study put it: "The absolute energy saved in the lowest quartile [by initial fuel use] was less than a quarter of that saved in the highest quartile, in spite of the fact that the percentage improvement in infiltration stopping was substantially the same in both cases."²

If any percentage savings of a big fuel bill is better than the same percent for a small bill, it is still better to get the biggest savings on the biggest fuel bills. That happy result is what ought to occur if highest priority is given to the leakiest houses and to those with the highest fuel bills.

¹ Synertech Systems Corporation, Integrating Analytical Tactics into New York State's Weatherization Assistance Program: Project Findings (NYSERDA Report 87-21, prepared for NYSERDA and NYS Department of State, 1987).

² Ibid., p. 7-10.

SECTION 4

COORDINATION BETWEEN WAP AND LIHEAP

Because WAP and LIHEAP serve substantially the same clientele, and because the WAP program depends heavily on funds appropriated under the federal LIHEAP legislation, it is natural to inquire the extent into which the programs are coordinated. The Legislative Research Commission put this question as follows:

Determine how the Weatherization Assistance Program and Low Income Home Energy Assistance Program can be better coordinated or consolidated, including:

- 1) in what areas do these two programs reflect goals, objectives, and practices which could be coordinated or consolidated?
- 2) if the two programs were coordinated or consolidated, what organizational modifications would need to take place, what barriers would have to be overcome, and what benefits could be realistically expected?

We will attempt to address these issues at both the state and local levels.

4.1 WAP and LIHEAP at the State Level

Three points stand out:

(1) WAP and LIHEAP are completely different programs with completely different administrative requirements, so there is little need for "coordination" on routine administrative matters at the state level. Functionally speaking, LIHEAP involves issuing checks to energy vendors on behalf of individuals certified as meeting income guidelines. WAP (at the state level) involves overseeing local agencies. With respect to most operating policies (e.g., uniform standards for income verification) or administrative efficiencies (e.g., economical use of computer time), it is more important that LIHEAP be coordinated with other income-transfer programs than with WAP. By the same token, it is more important that WAP be coordinated with other housing programs than with LIHEAP.

(2) At the policy level, therefore, what is needed is not "coordination" but decisions. Funds appropriated under LIHEAP legislation are used for WAP. As we have suggested elsewhere in this report, in principle the choice between the two programs is a choice between trying to achieve long-term cost-effectiveness and trying to meet immediate human needs that cannot wait. Neither in principle nor in practice, is there one "right" way to strike this balance. Joint task forces, review procedures that involve all decision-makers, and the intangibles of trust and

good will among administrators may increase confidence that the balance has been struck as wisely as possible. But they cannot make the decision much easier.

(3) It is also true that uncoordinated efforts may lead to wasted resources. In Kentucky, DSI administrators have sometimes supported experimental and demonstration programs, based on the judgment that WAP administrators were not fully receptive to innovation. For example, one such experiment -- involving retrofits of heat exchangers to gas furnaces -- tested a new technology. That the energy savings proved disappointing does not diminish the value of the research. (Negative conclusions are valuable if they enable people to avoid making costly mistakes on a large scale.)

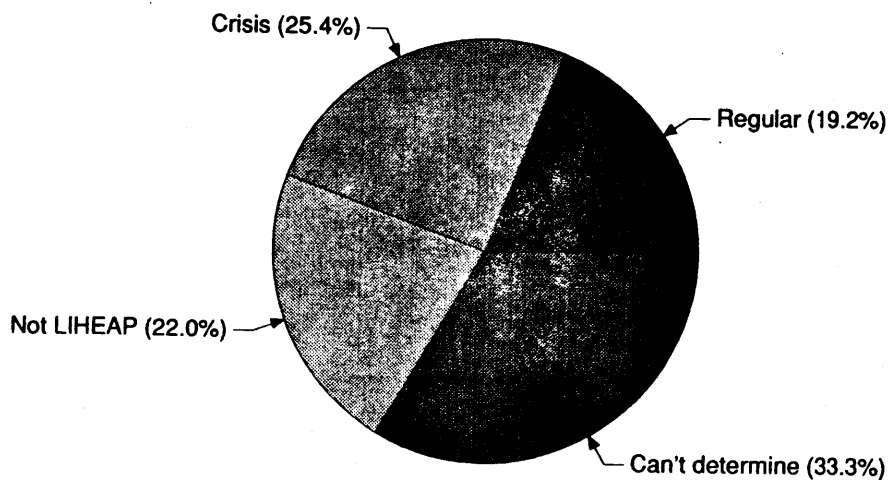
We agree that the WAP program has been too conservative technologically, but we believe that alternatives should be tried after a coordinated review process that uses expertise from all relevant offices. Strictly speaking, however, this is not coordination between the existing programs of WAP and LIHEAP but coordination in exploring new approaches to energy conservation in the low-income sector -- which is a matter of legitimate concern to both WAP and LIHEAP administrators.

4.2 Coordination at the Local Level

It is entirely appropriate for Kentucky legislators and policy-makers to wonder if energy conservation (which mostly means WAP) might not save money on energy assistance (meaning LIHEAP). Obviously, if this is to happen, one of the things that must occur is for WAP to serve LIHEAP clients. We asked subgrantees how many of their ten most recent completions had been done for LIHEAP clients. Figure 9 shows their response.

Fig. 9

WAP Clients Who Were Also LIHEAP Clients, As Indicated by Survey Responses



The most striking difference between LIHEAP and WAP clients is that far more LIHEAP clients are renters. As a practical matter, this greatly reduces their chances of being served by WAP because of the 15 percent ceiling on tenant-occupied weatherizations. To the extent that Kentucky prefers providing direct cash benefits to utilities and fuel vendors (by reducing the incidence of unpaid bills) over providing in-kind benefits to landlords (by improving the energy efficiency of their properties), then the opportunities for using WAP to reduce the LIHEAP rolls will be correspondingly reduced. As noted elsewhere, this is a clear-cut policy choice.

Since the LIHEAP crisis program is administered (with four exceptions) by the same agencies that administer WAP, there should be few barriers to getting LIHEAP crisis clients into WAP. Most weatherization coordinators said that the principal problems had nothing to do with the flow of information but with geographical quotas and the limits on rentals -- again, policy issues rather than "coordination" problems. Moreover, there is often such a waiting list for WAP that local coordinators do not feel a need to seek more applicants, whether from LIHEAP or not.

Coordination with the "regular" LIHEAP program is somewhat more problematical. In our survey, we asked weatherization subgrantees about the extent to which they received printouts of LIHEAP clients. Almost all (21 out of 23, or 91 percent) said that they did. Obviously, we had no way of verifying whether a printout might not have been received and subsequently misplaced, still less the extent to which a printout received was actually used. The main point is that, even at the local level, making the most effective combined use of WAP and LIHEAP funds depends more on policy decisions (e.g., percentage of renters served) than on such "administrative" devices as providing lists of eligible clients.

SECTION 5

CONCLUSIONS AND RECOMMENDATIONS

While it is clear to us that the WAP programs in Kentucky are operating far more efficiently and effectively than they were six years ago, and while it is also clear that Kentucky's overall efforts in energy conservation are comparable to those in many other states, we believe that much can be done to improve energy-related programs throughout the state.

5.1 Maintain and Strengthen a Commitment to Conservation

Energy conservation and energy assistance programs must compete for scarce resources. We cannot say exactly how the balance between them should be struck, but we recommend allocating discretionary resources to conservation to the maximum extent feasible.

Energy conservation, while it may serve fewer individuals than energy assistance, is better both for those individuals and for the state as a whole. It is appropriate to help pay the bills of families facing immediate needs, but those needs tend to recur year after year. In this respect, energy-related welfare programs are like other welfare programs. Properly installed conservation measures at least offer hope of breaking a cycle of dependency on public subsidies. In addition to energy conservation, a collateral benefit of increasing support for WAP is the multiplier effect of job creation. Although we have been at pains to stress that we do not regard WAP as a jobs program, it remains true that salaries to crew members (whether on the staffs of subgrantees or private contractors) are spent locally. A multiplier effect also exists for funds disbursed to energy vendors, but it is less clear how much occurs in Kentucky.

The Kentucky Legislature's original legislation that called for a perpetual trust fund for WAP appeared to be a creative strategy. When the decision was made to limit its "perpetuity" to ten years or less, the 60-40 split in favor of LIHEAP was introduced. The reasons for this decision are unknown to us. Whatever the rationale, our first recommendation is:

***Recommendation 1 -- Funding Allocations:** The legislature should reconsider the current funding formulas of the oil overcharge (PVE) funds relating to LIHEAP, WAP, and the conservation programs administered by KEC, as established in 88 RS BR 488/GA. At the very minimum, we suggest that the initial ratio between WAP and LIHEAP be reversed, i.e., changed to 60 percent for WAP, 40 percent for LIHEAP. We also support additional funds for other energy conservation programs, notably those sponsored by KEC (see Section 5.7).*

It may be (but we do not know this) that the Legislature doubted that a service program like WAP could rapidly accelerate its spending in a cost-effective manner. That is a legitimate concern. We think that a 60-40 split in favor of WAP reflects a reasonable presumption that a commitment to conservation will pay dividends.

If we were confident that WAP will move expeditiously toward performance-based standards, we would recommend that even more discretionary resources (oil overcharge, also known as PVE, funds) be allocated to conservation. We recommend that the Legislature be prepared to increase the WAP portion of the fund whenever evidence is developed that suggests that WAP's theoretical potential is beginning to be realized in practice.

To advance that goal, the remainder of our recommendations on WAP deal with ways of improving its cost-effectiveness.

5.2 WAP Technical Recommendations

The greatest cause of energy waste in residential buildings is unnecessary infiltration of cold outside air into the warm building interior and exfiltration of warm inside air to the out-of-doors. Current rules give this problem top priority, but weatherization crews need training and equipment that they presently lack. Weatherization is not the same as basic home improvement; those individuals who have shown excellent skills in basic home repair do not necessarily know state-of-the-art techniques in reducing the number of air changes per hour. Equipment -- primarily blower doors and infrared scanners -- is critical, and with the improved equipment must come training in how to diagnose and correct such infiltration. With adequate training and equipment, the WAP program can move to a performance-based system, that emphasizes and measures actual energy savings, rather than the current prescriptive-based system, that specifies allowable measures and dollar limits. These are the keys to improving the current WAP program in Kentucky. The specific changes that should be made are as follows:

Recommendation 2 -- Diagnostic Technology: WAP administrators should redirect the current focus of the weatherization operations to emphasize verifiable energy savings, as indicated by modern diagnostic technology, particularly blower doors. This will require reevaluation and partial rewrite of The Home Heating Audit and modification of Project Retro-Tech, to be approved by the federal Department of Energy, as referenced in Title 10 CFR Part 440.14 (b)(5) and 440.21 (f).

Every WAP subgrantee using crews should be equipped with at least one blower door as soon as possible. Ideally, each crew doing basic infiltration-reduction work should have one, but some projects may reduce their need for blower doors by using crews for special functions, such as installing insulation. (This will not, of course, be feasible for projects serving counties within a large geographical area.)

Programs using contractors for basic infiltration-stopping should move toward requiring contractors to purchase blower doors as a condition of program participation. (A longer phase-in time will be required for this. Moreover, this recommendation does not apply to a program like Louisville's, in which the City uses Project WARM workers as an infiltration-stopping crew.) The DES should investigate the economies and training advantages associated with a mass buy of blower doors, rather than leaving it to subgrantees to purchase them piecemeal. The blower doors purchased should be configured to provide a printout of air changes at every reading taken, so as to provide a paper trail of measured infiltration rates before, during, and after weatherization. This is critical data for evaluation.

In the event that it proves infeasible to equip all subgrantees with blower doors in one year, the DES should consider a transitional pilot program that will make adoption of the technology attractive. One option would be to provide participating agencies who spend part of their own allocation on blower doors with relief from the 40 percent materials rule. (See also the recommendation in Section 5.3 below.) This relief should be conditioned on the subgrantees' actually achieving a target reduction in air changes per hour. (See below.) This means that blower doors should be integrated into programs at the point of pre-inspection.

Recommendation 3 -- Selection of Measures: DES administrators should require that weatherization measures be based on air changes per hour and develop target reductions for various dwelling units. These targets should replace the current dollar targets now in use. This will require a re-write of WX-3, the Weatherization Survey Sheet. DES administrators should also place increased focus on blowing cellulose into walls and on improvements in furnace efficiency.

This will, in most instances, mean some change in current project operations -- specifically, sending an initial infiltration-stopping crew along with the inspector to plug major leaks as soon as they are pinpointed, leaving window and door replacements, insulation, and other functions requiring custom measurements to be done as they are now done -- i.e., in response to a work order. Subgrantee inspectors should be directed to gather as much information as possible about client fuel bills as part of the pre-inspection process. This information should be used in making decisions about how much money to spend on a given house or trailer.

An additional emphasis on blowing cellulose in walls would make good sense. This is a known winner and energy saver, which has the dual benefits of accomplishing air sealing and diminishing conductive losses. It probably also contributes more to summertime comfort than do all other measures. Furnace and air conditioning (where they exist) distribution systems are frequently in need of retrofit, sealing, and insulation. Particularly as dwellings are made more air tight, these measures can contribute importantly to additional savings.

Recommendation 4 -- Monitoring and Evaluation: As WAP moves into a performance-based operational mode, DES state monitors should be equipped with blower doors

and use them as part of their routine monitoring work. Once the performance-based system is at least partially operational, DES should conduct an independent review to compare before-and-after savings for WAP and non-WAP clients, and for WAP clients in the performance-based system as compared with those served using current practices.

Using blower doors during monitoring visits implies increased emphasis on measurement as an indicator of infiltration, and a corresponding reduction in emphasis on appearance factors in monitoring reports. It also assumes that the overall program will move in the direction of a performance-based activity to save energy as shown in air changes per hour rather than the more prescriptive (but not as technically valid from the energy-saving standpoint) that it currently is.

We recommend that DES should consider contracting for an evaluation of the WAP program that would measure before-and-after savings. One useful design might involve three groups: (1) those being weatherized under current practices, (2) those weatherized after diagnostic technology is in common use, and (3) a control group of eligible but unweatherized houses on project waiting lists.

Recommendation 5 -- Training Improvements: *DES should equip a state-level training program with one high-quality infrared scanner and video display. Trainers be adequately equipped in and fully conversant with new technological aids in weatherization diagnostics. Further, there should be more frequent hands-on training at the local level -- and perhaps at the job site -- rather than is currently the case. Because of the prevalence of mobile homes in rural areas, special emphasis should be given to training in weatherizing them.*

If appropriate, DES may wish to contract with other firms in these technologies to develop "train the trainers"-type workshops, in which staff are instructed in how to teach the actual crews about infiltration-reduction methods. Additionally, because of the prevalence of mobile homes in rural areas (for a few projects, mobile homes account for up to 75 percent of completions), special emphasis should be given to training in weatherizing them.

5.3 WAP Administrative Recommendations

As noted earlier, we are impressed by the administrative improvements seen in the six years since we first visited the WAP program in Kentucky. At that time, there was too much variability -- and, indeed, too little accountability -- at the local level. Since that time, state oversight has improved markedly, and the local subgrantees are much more careful about following federal and state guidelines. As a consequence, however, state officials may have needlessly sacrificed some desirable flexibility and innovation.

More to the point, WAP is hampered by strict DOE requirements on: 1) the ratio of materials to the entire project cost; 2) the selection criteria that overwhelmingly favors the elderly and handicapped; and 3) the lack of criteria that consider high energy costs as a factor in selecting buildings to be weatherized.

These impediments can be counterproductive to the objectives of WAP, but they exist as barriers only for federal WAP funds. They need not exist for the LIHEAP 15 percent transfer, nor for PVE funds dedicated to weatherization. The fact that DES has chosen to impose DOE guidelines on all WAP funds is needlessly restrictive, in our view. Many states are taking advantage of the PVE funds to fund "weatherization" (as opposed to "WAP") programs for low-income residents under the rubric of SECP and EES, or even those allowable uses under the "Chevron" and "OHA" guidelines of the Stripper Well Agreement.¹

Kentucky could, at its discretion, fund "WAP" and "weatherization" programs, or, better yet, allow subgrantees to use the mix of "WAP" and "LIHEAP/-PVE" funds to enhance the existing WAP program so as to minimize adverse effects of otherwise reasonable DOE regulations. In addition to these more general administrative suggestions, we recommend the following:

Recommendation 6 -- The 40 Percent for Materials: Once DES has succeeded in establishing workable performance-based standards, it should relax the "40 percent for materials" rule by excluding LIHEAP and oil overcharge funds from its coverage.

Kentucky is not alone in its problems with the DOE regulation on materials. At this time, however, the regulations covering allowable uses for DOE funds -- which make the stipulation on 40 percent for materials² -- are still in effect. (See also footnote 3, below.) Because the DOE regulations do not apply to LIHEAP and PVE funds, DES can begin now to relax the rule, absent national action.

This would end an existing incentive to spend more than is needed for materials. However, in order not to re-create incentives to spend more than is needed on project labor, this flexibility should hinge on subgrantees' adoption of sound audit practices.³ One important safeguard against excessive labor costs is careful review of project "program support" costs. The DES should continue its efforts to see that such costs are accounted for and reported in a uniform manner, and should make sure that subgrantees understand the rationale underlying its directives in this area.

Recommendation 7 -- The "Fairness" Doctrine: DES should actively discourage the prevalent (albeit unwritten) notion among subgrantees that "fairness" means that every

¹ See Appendix B for a full discussion of the requirements that must be met in order for a state to spend its PVE funds. Nearly any bona fide energy conservation activity ultimately designed to help consumers has a good chance of being approved.

² "Allowable Expenditures," Section 440.18, in the Federal Register, "Weatherization Assistance for Low-Income Persons," 10 CFR Part 440, Section 440.18.

³ As noted in Section 3.6.4, our recommendation is consistent with national legislation to authorize DOE to relax the 40-percent rule if states adopt sound audit procedures. See, for example, two bills in the respective energy subcommittees of each house of the Congress, H.R. 711 and S. 247.

eligible client is entitled to have the approximately the same amount of money spent on his or her house as every other client, and that it should be as close to the allowable \$1600 limit as possible. An important part of the strategy should be publicity that program targets will be expressed in terms of desired results, not levels of expenditure.

This attitude, deeply ingrained and reinforced by local politics, cannot be easily changed. An important part of the strategy should be publicity that program targets will be expressed in terms of desired energy savings, not levels of expenditure. As a way of signalling its own support of this policy, the DES should encourage subgrantees to submit requests for waivers of even the \$2,000 ceiling on single units, when it can be shown that significant energy savings will be attained that could not be attained otherwise. These exceptions on the high side will have to be offset by houses and trailers weatherized at the sub-\$1,000 level, a practice we believe would often be cost-effective.

5.3 Recommendations for WAP Policy Reviews

A number of items are not so easily changed. They warrant fuller consideration of the anticipated benefits, and will require approval by the Legislature. We encourage Kentucky to consider the following:

Recommendation 8 -- The 15 Percent Ceiling on Rental Units: *The DES should invite an independent review of the impact on low-income rental households of the 15 percent ceiling on rental units weatherized. If appropriate, the Department should reevaluate its policy regarding rental properties.*

If an independent review points to adverse impacts, options are: (a) leaving the matter to local determination, (b) finding ways to get landlords to share in the costs of items that appreciably improve the appearance of a unit, or (c) putting a ceiling on the number of units that can be weatherized for any single property owner, rather than a ceiling on subgrantees.

Otherwise the Legislature, in its consideration of the separate study on LIHEAP, should be aware that the primary reason that WAP does not serve more LIHEAP clients is that the current WAP restrictions on rental properties effectively rule out a large portion of the LIHEAP client base. If legislators hope to provide more WAP services to LIHEAP clients, they will need to revise the regulation.

Recommendation 9 -- Selection Criteria: *DES administrators should reevaluate the overwhelmingly high priority given to elderly and handicapped, and consider other factors in the point system used for selecting among WAP applicants. Although regulation Title 10 CFR Part 440.16 (b) identifies "high energy consuming dwelling units" among the priority categories, form WX-1 gives so few points to this category as to make it virtually meaningless.*

Current DOE regulations require that "priority" should be given to the elderly and handicapped, but they do not spell out in great exactness what that

priority should actually be. (They must approve the state's intentions in this area, as explained in the state WAP plan.) Kentucky has chosen to develop a system that awards points based on elderly, handicapped, condition of home, percentage of fuel bills, etc. (See WX-1 reproduced as Figure 3 of this report.)

Everyone interviewed at both the state and local levels expressed strong support for giving priority to the elderly and handicapped -- which is, in any case, a statutory requirement for WAP. Nevertheless, several coordinators felt that the state point system gave so little weight to other factors as to produce two unfortunate side effects. First, in some areas of the state, many needy families -- especially the growing number of female-headed households with children -- are effectively denied service. (One interviewee pointed out that a number of widowed and unemployed women in their late '50s are also denied service.)

Second, in other areas, subgrantees are running low on elderly and handicapped households that meet WAP income guidelines. The effect of these two problems are the same: subgrantees spend scarce resources on houses in relatively good condition because their occupants are elderly -- neglecting worse housing occupied by equally needy households. We recommend a state-level review of the applicant priority system to determine if more points should be assigned to other factors -- primarily size of energy bills.

Recommendation 10 -- Encouraging Innovation in Weatherization Programs: DES/DSI administrators should work together to develop a review process to encourage innovative approaches to weatherization. A sizable portion of the LIHEAP 15 percent transfer should be directed to innovative efforts.

We believe that the existing compartmentalization of low-income energy conservation programs prohibits innovative programs which cut across departmental or division lines. Most state and local program managers see their responsibilities as carrying out discrete tasks, independent of other programs and activities. This often means that innovative ideas and approaches are non-existent or ineffective as true demonstrations.

We recommend that an appreciable amount of funds be allocated to encouraging experiments. Initially, this might consist largely of funds allocated to adopting the diagnostic techniques recommended above, which, though not really experimental, are new to Kentucky. We would also encourage pilots dealing with public-private partnerships. In later years, other innovations, such as energy-efficient lighting, will doubtless suggest themselves. We cannot emphasize enough, however, that a review process on alternative program approaches should include both DES and DSI representatives. (It may be that the pending reorganization will address this issue.) The involvement of the Policy Advisory Council, as required by KAR 440.17 may also be appropriate in the decisionmaking. Note that this recommendation deals with programs related to the existing weatherization program or similar models (e.g., GEER) only. We would like to see the concept greatly expanded. We make recommendations for such a process in the following two sections.

5.5 Recommendations on Coordination between WAP and Other Agencies/Organizations

WAP and LIHEAP serve the same target audience, but there the similarity ends. Since the strategies underlying the programs are essentially antithetical to each other, state-level coordination must deal with policy, not with procedures. At the local level, we are dealing with individuals and families, who lack heat and/or money and hence need help. Here, coordination of WAP, LIHEAP, and all other available services is of critical importance. WAP subgrantees are aware of LIHEAP to the extent that: 1) WAP and LIHEAP "crisis" program are generally located in the same agency, and 2) WAP subgrantees are provided with a computerized print-out of "regular" LIHEAP recipients on an annual basis.¹

Our impression is that exchange of information is less a problem than WAP restrictions on eligibility, principally on serving tenants.

Another area for coordination is between public and private sector agencies. In our survey, we asked whether the WAP officials were aware of any privately sponsored activities intended for low-income persons in their area. This approach identified few such programs; we also note that WAP managers did not refer us to some activities that we know to exist (i.e., RCS and TVA programs).² It appears that WAP officials do not seem to be taking advantage of available resources from other groups, including informational materials developed and/or sponsored by the KEC. Only one survey respondent, for example, mentioned what might be one of the GEER activities³, the SWAT seniors programs, or PILIRR. Further, only two agencies reported using videotapes for training, even though KEC has developed one on low-cost/no-cost targeted to low-income persons. This suggests that local WAP programs are operating essentially independently from other efforts.

We suggest that WAP also consider working with the local utilities, in those areas where the utilities are receptive to such linkages.²⁶⁰ In Pennsylvania and

¹ Several states have attempted more formal coordination between WAP and LIHEAP, including trying to focus WAP services on those LIHEAP customers who seem to be in greatest need. South Carolina, for example, at one time provided three separate lists of LIHEAP recipients -- for elderly, handicapped, and all other. These were provided both alphabetically and were also cross-referenced to the applicant's total income. WAP officials used the lists to target outreach efforts and as an aid in selecting clients when all other factors were equal.

² It is possible that the respondents did not consider TVA or even "utilities" to be "private sector," and hence focused only on church, university, or other such groups.

³ The actual reference was to one of the aging groups "that does rehab work," which we concluded was one of the GEER subgrantees. It is likely -- although not definite -- that the rehab work was being done under the auspices of GEER.

²⁶⁰ Some utilities are, some are not. From national experience, we know that some utilities do RCS and other conservation programs only because they are required to do so. (They support LIHEAP because it pays fuel bills, and is thus simply a transfer payment to the

California, for example, utility monies have been used to directly fund weatherization activities of various kinds. In the case of California, the two largest utilities sponsor weatherization training at a sophisticated state-wide weatherization training center.

In response to a legislative initiative implemented by the Public Utility Commission, the public utilities in Pennsylvania currently supplement weatherization program funding at a level that approaches the DOE grant. Finally, in New York State, many of the public utilities count audits performed as a routine part of weatherization as RCS audits. They pay the local WAP subgrantees \$100 for each documented audit. The agencies thus find themselves with an extra \$100 per weatherization job at the cost of five minutes of documentation. The utilities are pleased to have the low-income sector of their client base better served, and the Public Service Commission is happy to see enhanced RCS services. Incidentally, most local agencies use the extra money to replace furnaces and to provide improvements that are not allowable under DOE regulations, or for allowable measures for the client whose WAP funding is already at the limit.

But an overriding point must be made across the board: local WAP offices should try to take advantage of and work with other public and private agencies to improve the quality of shelter for low-income persons. Although KAR 440.16 (e) addresses the issue of coordination with other programs, it is so general (at the state level) as to be without value. At the local level, it refers to the joint location of WAP and LIHEAP in the same agency, an advantage generally but inadequate as a major goal. Thus:

***Recommendation 11 -- Coordination with Other Programs:** Pursuant to Title 10 CFR Part 440.16(e), DES should develop policies to include specific language encouraging coordination with other programs, and spelling out what that coordination might be. DES should provide financial assistance to one or two pilot programs that include private-sector resources as an integral component of WAP services.*

We confess that it is easy to "second-guess" state and local officials who are trying to balance fairly rigid WAP regulations with rather amorphous "good-will" from the private sector. But the fact is that Project WARM does work, and that many states have combined weatherization programs with utility activities. More specific guidelines on what can and cannot be done, or what should and should not be attempted, seems to be in order. Also, using some of the PVE or LIHEAP weatherization funds for pilots as described in Recommendation 10 -- and disseminating the information and techniques to non-pilot agencies -- appears a reasonable course of action.

utility.) But many utilities are changing, and it is generally worthwhile for WAP agencies to establish a dialogue with utilities, even where there seems to be little likelihood of coordination in the near future.

5.6 Recommendations on Other Conservation Programs

5.6.1 Organization Comments

We were invited to consider the administrative structure and placement of the various energy programs as part of this research. In particular, KEC, KEES, and ICP are located within the Division of Conservation within the Department of Energy Production and Utilization of the Kentucky Energy Cabinet, and WAP is part of the Department for Employment Services within the Cabinet for Human Resources.

On the face of it, one might question the placement of energy conservation programs within either an energy production or an employment services office. We did not explore this issue, and no problems arising from present organizational arrangements came to our attention. State energy offices (SEOs) elsewhere nearly always manage the EES, ICP, and SECP activities; some additionally manage WAP. SEOs are often placed as cabinet-level departments, as advisory agencies to the governor, or included in economic development, natural resources, or even public service commissions.

Regarding WAP's placement in DES, many other states also include WAP in their cabinet-level human resources departments, although not usually with "employment services" as the department name. Regarding the Division of Conservation, we note that conservation efforts at DOE and in other states have seldom competed effectively for resources (meaning management attention as well as budget) when housed within divisions whose principal mission was to stimulate production. In short, we think energy conservation to be of sufficient importance to merit more visibility at top administrative levels in both KEC and CHR. However, if the present arrangements are satisfactory, we do not recommend "fixing" them.

Regardless of the placement issue, we observed that KEC, in particular, is working under a real disadvantage. The Division of Conservation (which is what we refer to when we use the acronym of the parent cabinet department), manages the ICP, SECP, and EES programs.¹ It has a broad mandate but very little funding. It relies totally on the PVE funds dedicated to the ICP program, the federal grant funds (which have been greatly reduced in recent years, and may end entirely in the near future), and a small amount of cash and in-kind state matching funds.

This is unfortunate, since it is the KEC's responsibility to plan and consider the long-term energy conservation needs of the people of Kentucky and also to support conservation in all sectors, not just the low-income. We see their role as one of strategic planning for all sectors, and tactical initiatives in some sectors (e.g., industrial, commercial, institution). We are very impressed with how KEC has been able to stretch their dollars and to advance conservation initiatives. The

¹ It also managed KESF, but the future of that program is uncertain.

SWAT programs, the give-away caulk, the videotapes -- all seem to be worthwhile efforts done at very low cost. Although we did not study GEER and RCS in any depth, we were also impressed by the willingness of their parent agencies to support these activities, absent any funding from the state.¹

5.6.2 Developing a Broader Conservation Strategy

A great deal is going on in energy conservation nationally that cuts across many sectors. Carpools and vanpools are energy conservation strategies with long-term economic development and planning components. There is a great deal being done in lighting technology that would be useful in many applications. All sectors will be affected (and there could be considerable savings in weatherization through new low wattage fluorescent bulbs that fit in standard incandescent sockets), but commercial and industrial sectors probably offer the greatest potential for savings. Many conservation programs, especially those involving new technologies, can serve an important economic development role by stimulating the growth of small businesses.

Other emerging technologies are also applicable to large energy users; these include large-scale heat recovery, cogeneration, energy management systems, advances in air handling controls, and in chiller technology. (For example, new gas-fired chillers are almost as efficient as electric chillers, but they use fuel that costs far less.) Additionally, innovations in conservation financing (guaranteed savings, performance contracting, etc.) should be investigated and disseminated.

Several states² have ongoing programs to encourage innovation while also promoting better coordination between state energy and related agencies; we believe that such an approach might work well in Kentucky. We suggest that KEC be the focal point for state energy conservation planning, and research and development (R&D) activities. We will address each of these in turn.

In the coordination and planning area, we recommend an innovative grants and contracts program that is akin to that recommended for weatherization, but larger and more broad-based. Funding on the order of \$500,000 to \$1,000,000 would be desirable. We also recommend that a standing Energy Conservation Coordinating Committee be developed which would recommend policy options and decide on funding for these innovative grants. The committee should include representatives from DES, DSI, KHC, the PSC, the Legislature, local governments, fuel suppliers, universities, and appropriate community groups, but it should be staffed by the KEC. It should meet quarterly, and its mission should be to shape the state's energy future. It could help develop energy emergency planning procedures, determine the appropriate balance between conservation and produc-

¹ Because we did not investigate the KEC, RCS, and GEER programs with the thoroughness of our WAP evaluation, we must emphasize that we are speaking from appearances, not analyses.

² Maryland, Colorado, New York, and Pennsylvania, among others.

tion, and select emphasis areas for conservation initiatives. Obviously, it cannot duplicate and should not "second guess" those activities now being undertaken by existing state agencies and legislative committees, but it can ensure that all agencies involved in energy conservation issues are properly informed of developments elsewhere, and that they use this information in formulating new ideas.

This Committee would also be charged with developing Requests for Proposals (RFPs) and making selections among the proposals for innovative grants. The Committee should seek a balance between types of target audiences served (industrial, residential, transportation, etc.), types of services (general education, hands-on education, loans, incentives), and different delivery mechanisms (universities, church groups, community organizations). A primary criterion for all the innovative grants should be that they leverage a large proportion of private or community funds, that they have a broad base of support from many diverse organizations, and that they have well-proven technical competence in providing such services.

Innovative grants are demonstration projects that must be well advertised in order to be successful. For this, quarterly or semiannual workshops and conferences, and/or a monthly newsletter will help to disseminate information throughout the state. KEC edits an attractive and informative newsletter, Conservation Update, that is a major resource for SEOs throughout the nation;¹ it includes highlights of new programs, giving a name and telephone for more information. A similar newsletter for the diverse agencies and organizations within Kentucky is also needed.

In summary, we have suggested three mechanisms as a way to improve coordination and provide access to new information; these are:

- 1) A coordinating committee that meets regularly to exchange ideas;
- 2) An innovative grant and/or contract program that is developed and selected by the group as a whole, and whose criteria give preference to well-coordinated and joint efforts; and
- 3) Workshops, meetings, and/or newsletters designed to keep everyone in the state better informed of what is being tried and done in other agencies and organizations.

The overall recommendation to accomplish these activities is as follows:

Recommendation 12 -- Overall Policy for Statewide Initiatives: The role of the

¹ KEC gets separate funding from DOE specifically for this newsletter; it is not included as a EES or SECP activity. However, many other states do have regular publications coming out of their energy offices. Most of these are essentially public relations, or directed only to the general consumer. For Kentucky, we recommend instead a newsletter directed to the energy program manager -- in local agencies, utilities, universities -- and other interested persons in the Legislature, other state agencies, etc.

Division of Conservation, specifically, and of the Kentucky Energy Cabinet, generally, as currently defined in KRS Chapter 152A should be reexamined by the Administration and the General Assembly. One centralized clearinghouse for innovative technologies in conservation, and one coordinated policy for spurring innovation among all sectors is needed. Adequate PVE funding, as currently allocated in KRS 42.560-574 should be upwardly revised to allow the Division of Conservation (or whatever other agency is selected for the function) to carry out this statewide coordination and innovation function. The establishment of a broad-based coordinating committee is also recommended.

Chapter 152A spells out the various duties and responsibilities of the Energy Cabinet, but the overwhelming emphasis is on production and research. That is understandable, given the fact that Kentucky's economy is based on coal. Nonetheless, it means that coordination of, and research into, non-production energy strategies is inadequate.

We do not believe that huge sums are necessary, and we are not recommending an Energy Resource Center to conduct independent research. Rather, keeping abreast of developments in other states and countries, and actively disseminating that information through workshops, newsletters, and word-of-mouth is very important. Further, innovative grants to community-based organizations, local governments, and state and local educational facilities can provide a worthwhile spark for very cost-effective conservation programs.

Ideally, the energy conservation coordinating council would be roughly equivalent to the Energy Research Board (Section 152A.060) in status, signalling the equal priority on production and conservation. However, that is not as important as a collection of hard-working, dedicated individuals from diverse organizations whose mission is to work together to ensure that all conservation activities serve as many people, in as cost-effective a manner, as is possible.

In summing up, we offer our original theory of the six "P's." Why does a program work in one place and fail in another? Why does a program not work as well as it could? We believe that the answers can be found in philosophy, people, planning, policies, and promotion. And, of course, all is lost without pennies (or more!).

Philosophy is the overall belief in a program; nothing gets started without it. By virtue of personal energy, education, experience, intelligence, and charm, one person can succeed where all others might fail. With adequate planning during the design of a project, programs run smoothly after they begin. With the right administrative policies, unreasonable impediments do not exist and appropriate evaluation and monitoring works to continually improve a program. With adequate promotion, people copy good ideas and learn from others' mistakes. Without adequate resources, people leave and nothing exists.

The philosophy of energy conservation is a problem for many other states, particularly those that are energy producers and exporters, rather than energy importers. With excess generating capacity and an overall economic philosophy that equates energy production with economic health, truly excellent conservation

programs are not common. With that in mind, Kentucky is doing as well as many, and better than some, of its sister energy-producing states. In any case, the issue of philosophy is one for the state itself to address.

Throughout all the energy programs we examined, there was no doubt that people are not the problem. At the state and local levels, the overwhelming number of staff are competent and dedicated.

Among WAP programs, the largest problems appear to be policy-related, primarily because they emphasize dollars rather than performance. A redirection of the overall emphasis of the program will require reconsideration of a large number of current policies and practices that result from those policies.

The primary needs of the non-WAP conservation programs appear to be in the areas of planning and promotion. We have also recommended some redistributions of the pennies allocated to each of the programs, but we believe that these are secondary issues.

We believe that these non-philosophical issues are more readily addressed. Although change may not come easily, the improvements undertaken since our last visit attest to the state's ability to make further modifications and to better serve its citizens.

APPENDIX A: SPECIFIC PROGRAMS

The following sections describe the specific interrelationships of the various energy programs in Kentucky. The primary focus is on state programs dealing with energy conservation rather than assistance, although the LIHEAP effort is noted for comparison purposes.

As noted in the overall organization chart on the following page, there are two primary cabinets involved in energy -- the Cabinet for Human Resources and the Cabinet for Energy Resources. The Public Service Commission and the Kentucky Housing Corporation, a quasigovernmental agency established by the legislature, are peripherally involved in the energy conservation programs, through the RCS and GEER efforts, respectively.

In addition to these state agencies, 25 local agencies manage the WAP at the local level, and 22 are involved in administering the crisis portion of LIHEAP.

The large, ongoing (or only recently abandoned) programs are described after the organization chart. They are placed in alphabetical order according to their state name, and include:

- Grants to the Elderly for Energy Repairs (GEER)
- Institutional Conservation Program (ICP)
- Kentucky Energy Conservation Plan (KECP)
- Kentucky Energy Extension Service (KEES)
- Kentucky Energy Savers Fund (KESF)
- Low-Income Home Energy Assistance Program (LIHEAP)
- Residential Conservation Service (RCS)
- Weatherization Assistance Program (WAP)

SWAT-JR and the three SWAT programs are described under the KECP and KEES, since they were submeasures of those activities.

These state programs are followed by representative (not comprehensive) examples of private-sector activities, including:

- Christian Appalachian Project
- Dow Corning Corporation
- Kentuckians for the Commonwealth
- Kentucky Power Company
- Project WARM
- South Louisville Community Ministries
- Tennessee Valley Authority (TVA)
- Wintercare

One note of caution should be emphasized. Although we have gone to considerable lengths to collect accurate appropriation and expenditures figures, it

has been a trying -- and ultimately unsuccessful -- task. We had hoped to get consistent figures for all programs by state fiscal year. However, because the various grant programs are funded by a combination of sources, and because they are usually integrated into division-wide groupings for state fiscal purposes, the reporting documents are usually broken down according to the predominate financial source under the budget category. This may be state fiscal year, but it is as often by federal fiscal year, by federal grant cycle, calendar year, or the like.

Further, accurate figures on expenditures by consistent time period are equally problematic, since they report according to diverse (state, federal, calendar) years. They often have no-cost and carryover funds that complicate the issue. We have made every effort to be both accurate and consistent, and have tried to note the details in footnotes or in the comments section of each program description.

When in doubt, we have erred on the side of consistency, and attempted to convert federal budget years or grant cycles to the equivalent state fiscal year. In other words, if we noticed that the budget award ran from July 1986 to June 1987, we assumed that it was budgeted for the 87 state fiscal year.

We have attempted to report -- and not editorialize -- on the various programs, leaving our comments for the recommendations section. Where it appears that one program may have been given fuller, or more positive, coverage, it is only because such information was available, and, we believed, important to the better understanding of the program.

PROGRAM: Grants to the Elderly for Energy Repairs (GEER)

1. **State-level administering agency:** Kentucky Housing Corporation (KHC), a private, non-profit corporation
2. **Federal oversight agency:** None
3. **Local administering agency(ies):** Each year, local government and non-profit agencies can submit proposals for funding under GEER. The number of participating organizations has ranged from six in 1983 to eighteen in 1988.
4. **Program goals:** GEER is designed to help elderly homeowners by providing funds to improve the energy efficiency of their homes -- and thus to provide financial relief, while also improving their health and safety.
5. **Target audience:** Low-income elderly homeowners.
6. **Specific limits/priorities:** GEER is limited to elderly (age 60 or over) homeowners who live in their homes. The annual family income may not exceed 50 percent of the area median income determined by the U.S. Department of Housing and Urban Development. There is a ceiling of \$3,000 per household. Allowable improvements must be energy-conserving; in order of priority, they are: 1) infiltration remedies; 2) mechanical modifications; 3) insulation; 4) heating, ventilating, and air conditioning (HVAC) and hot water improvements; 5) code repairs and maintenance.

In order to participate in GEER, local agencies must provide financial and administrative support. Their funding match can be limited to administrative support, or it can extend to other program monies. (In some cases, the local match is used for administration only; in other cases, it is used for non-weatherization rehabilitation work on structures; in still other cases, it is used for weatherization-related improvements.)

The KHC field inspector must approve all projects prior to funding.

7. **Legislative authority:** None.
8. **Current year funding and source(s):** \$200,000 in KHC discretionary funds.
9. **Budget History in Dollars¹**

SFY	Grant	State	PVE	Other	Total
88				200,000	200,000

¹ Source: Interview with Beccy Prather, KHC, 502-564-7630. These budget figures do not include matching funds provided by local agencies. The funds cited in the "other" column are KHC discretionary funds.

87	250,000	250,000
86		250,000
85		325,000
84		181,000

(During SFY 84, \$400,000 was allocated to the program, but it was not spent during the first year; the remainder was then reappropriated for SFY 85. During SFY 87, \$250,000 was provided in PVE funds through the HEAP discretionary conservation program.)

10. Spending History in Dollars¹

SFY Total Expenditures

88	248,011
87	237,516
86	637,000
85	181,000

11. Average cost per client served: KHC figures indicate that \$1,446.76 in GEER funds is the average amount provided to each client.

12. Average energy savings per client served: Unknown.

13. Other considerations/comments: GEER works through local subgrantees; these agencies may or may not be the same as those administering WAP. (In most cases, they are not.) A total of 30 local organizations and agencies have participated in GEER during the last five years. KHC issues a Request for Proposals (RFP) to which local agencies have responded. The local agencies submit proposals and are funded by KHC for a given fiscal year; in recent years, KHC has restricted the program to current subgrantees.

Although GEER was originally funded through KHC discretionary income resulting from bond issues, it was invited to apply for PVE funds in FY 88, and was awarded \$250,000. KHC applied again in FY 89, but was turned down, so they returned to KHC discretionary income for continued funding.

¹ Source: 9/22/88 proposal from KHC to CHR/Pat Bishop

PROGRAM: Institutional Conservation Program (ICP)

Other names: Schools and Hospitals Program
Institutional Buildings Grants Program (IBGP)

1. **State administering agency:** Division of Conservation, Department of Energy Production and Utilization, Kentucky Energy Cabinet (KEC)
2. **Federal oversight agency:** U.S. Department of Energy (DOE)
3. **Local administering agency(ies):** N/A
4. **Program goals:** To save energy in public and private non-profit schools (including colleges and universities) and hospitals, and thereby to reduce public expenditures and lower tax burdens to all taxpayers.
5. **Target audience:** Public and private non-profit schools (including colleges and universities) and hospitals.
6. **Specific limits/priorities:** For most grants, DOE provides 50 percent of the total costs, and the recipient pays the other 50 percent. Ten percent of the total grant is set aside for hardship cases; using a federally approved hardship formula, the state can make grants of between 50 and 90 percent of the total to specified hardship institutions, based upon a graduating scale of need.

The KEC, which manages the program, is entitled to use \$30,000, or five percent (whichever is greater) of the total DOE grant for administrative purposes, but it must also match this grant with an equal amount in state funds.

7. **Legislative authority:** Parts 1 and 2 of Title III of the National Energy Conservation Policy Act, 1978
8. **Current year funding and source(s):**

\$ 549,005	Federal grant
\$ 500,000	PVE funds
\$ 30,000	State match
<u>\$1,079,005</u>	Total

9. **Budget History¹**

FFY	Grant	State	PVE	Other	Total
88	555,597	30,000			585,597
87	839,003	41,950			880,953
86	942,879	47,143			990,022
85	1,073,897	47,430			1,121,327
84	1,687,324	57,988			1,745,312

10. **Spending History²**

FFY Total Expenditures

88	585,597
87	880,953
86	990,022
85	1,121,327
84	1,745,312

11. **Average cost per client served:** In the most recent year for which data is available (as of September 1987), 228 institutions (210 school buildings and 18 hospitals) were provided grants. The total costs for hospitals was \$3,154,395 (including their match), while the total costs for schools was \$11,343,347. This would suggest the average total cost of \$175,244 for hospitals and an average of \$54,016 for schools. It results in an overall average of \$63,587. Since this figure includes the match by the participating institutions, it should not be equated with state-only or grant-only figures. That amount could be estimated at 50 to 60 percent of the overall average.³
12. **Energy savings per client served, as estimated in response to federal/state reporting requirements:** Energy savings in participating hospitals has been calculated at 542,412 MBtu's, which calculates to an average reduction in energy usage of 25 percent. Energy savings in schools is calculated at 358,571 MBtu's, which represents an average savings of 24 percent. The total cost/MBtu's is calculated at \$9.00.

¹ Source: Budgets and allocations figures provided by KEC, plus an additional five percent for state-funded administrative costs. It should be noted that the grant cycles do not conform exactly with the federal fiscal year, but KEC staff indicated that they were reasonably close. Further, budget figures do not reflect matching funds provided by individual institutions.

² Source: Allocations and Btu savings figures provided by grant cycle by KEC. This information reflects total expenditures as they were paid out to local institutions, thus the question of administrative expenditures is not clear. We believe that the administrative expenditures equalled the budget, since that is customarily the case for ICP programs in nearly all state energy offices.

³ Source: KEC plans and reports filed annually with the U.S. Department of Energy

13. **Other considerations/comments:** In the early years of the programs, funds were provided for preliminary energy audits (PEAs), energy audits (EAs), technical assistance audits (TAs), and energy conservation measures (ECMs). PEAs were basically paperwork audits that were compiled by grantees as the first step in the application process for an energy audit; EAs were on-site audits that examined operation and maintenance improvements; TAs were detailed engineering assessments that recommended (and calculated costs and savings for) a range of capital improvements, and ECMs were the purchase and installation of those capital improvements.

All four services were available to schools and hospitals, but only PEAs and EAs were available to local government and public care facilities (such as orphanages and nursing homes). Because of lack of participation by local governments and public care facilities (which some attribute to the non-availability of ECM funds and others attribute to excessive paperwork for little return) there was little action in these sectors. Thus, these target audiences were eliminated from the program due to DOE funding cutbacks following 1980. As of this time, no services are available to the latter two groups, and only TAs and ECMs are provided for schools and hospitals.

Because the ICP requires detailed before-and-after reporting on energy costs, usage, and savings, the information provided on ICP savings can be considered "hard data," while estimates of most other programs are more appropriately "soft data."

Equally important, the discrepancy between available funding and total requests has been wide, with the funding for ICP falling far short of the requests for ECM funding from the various institutions. (These requests are based on engineering studies that show paybacks of five years or less.) For instance, FY 88 had a total allocation of \$581,790, yet requests which were filed totaled \$1,548,141.

PROGRAM: Kentucky Energy Conservation Plan (KECP)

Other names: State Energy Conservation Plan (SECP) -- national name

1. **State administering agency:** Division of Conservation, Department of Energy Production and Utilization, Kentucky Energy Cabinet (KEC)
2. **Federal oversight agency:** U.S. Department of Energy
3. **Local administering agency(ies):** None, although contracts are awarded to various public agencies, non-profit organizations, and private consultants for local projects, studies, etc.
4. **Program goals:** To save energy by instituting mandatory programs (thermal and lighting efficiency standards, procurement practices, carpooling and public transportation, and right-turn-on-red) as well as optional programs that the state might choose.
5. **Target audience:** The overall target audience for SECP includes all sectors of society; because of limited funding, however, the state has selected certain target audiences and programs of emphasis. These are designated as "sub-measures," and each must have a separate budget and schedule for implementation. Each of the submeasures in the FY 1989 plan of this program are delineated in item 13 below.
6. **Specific limits/priorities:** In the early years (1976-81) SECP was a 100 percent federal grant; it also included a requirement to save 5 percent of the projected energy use by 1980, and the amount of the upcoming year's federal grant was predicated in part on those energy savings. The energy savings requirement, while still reported, has lost its muscle as a funding stipulation, but the state must now provide 20 percent matching funds for SECP.
7. **Legislative authority:** The 1975 Energy Policy and Conservation Act (EPCA) established SECP, and the 1976 Energy Conservation and Production Act (ECPA) amended the program.
8. **Current year funding and source(s):¹**

\$166,000	Federal grant
\$187,616	Carryover
<u>\$ 33,200</u>	State match
\$386,816	Total

¹ Budget documents provided by Tom Hanna, KEC, and then extrapolated to Pendragon format for comparison purposes.

9. Budget History¹

FFY	Grant	State	PVE	Other	Total
88	172,200	34,440			206,640
87	320,300	64,060			384,360
86	418,500	83,700			502,200
85	429,300	85,860			515,160
84	432,800	86,560			519,360

10. Spending History²

FFY Total Expenditures

88	263,581
87	223,645
86	690,516
85	381,492
84	329,168

11. **Average cost per client served:** The KECP and KEES, its sister program, are both so diverse that it is impossible to determine the total number of clients served. Although surveying and sampling techniques are used to determine the total clientele, and although they may be useful in determining the target audience for one specific submeasure (which then could be divided by the total cost of that submeasure), there are no good figures for assessing the overall cost of KECP services for all clients reached.
12. **Energy savings per client served, as estimated in response to federal/state reporting requirements:** The KECP is so diverse that it is difficult to determine overall energy savings per dollar spent, let alone per client served. There are numerous evaluations of the various measures in each state's plan, since these studies were an integral component of SECP in the early years. The program has evolved in such a way that these early evaluations may no longer be relevant. Nonetheless, KEC does attempt to evaluate their programs using methodologies and practices acceptable to DOE. Based on these evaluations, state officials report that savings for FY 1987 were 149.47 MBtu, representing a total cost/MBtu of \$2.50.

Suffice it to say, however, that these savings estimates cannot be equated with the "hard data" of the ICP. Nonetheless, the figures do attempt to portray savings that result for state programs, as compared with estimated

¹ Source: Budgets and allocations figures have been provided by KEC. It should be noted that the grant cycles do not conform exactly with the federal fiscal year, but KEC staff indicated that they were reasonably close.

² Source: Ibid. Note, however, that the allocations often lag behind appropriations (a common occurrence for most SEOs), meaning that the carryover for each year is quite substantial. This is reflected in item 8, but not in item 9. One can take the totals in item 9 and subtract the expenditures in item 10 to determine the carryover for each subsequent year.

use if no such programs were available. Because of the "soft" nature of the data, as well as the fact that both programs are multifaceted, the savings estimates are inexact. This is a situation true of all SEOs reporting on the SECP and EES programs, and should not be considered a handicap of the KEC estimates.

13. Other considerations/comments:

SECP and EES are the only federal grant programs that allow state officials any discretion to undertake programs individual to their states. In the early years, the two differed from each other in that SECP emphasized energy savings (and thus, often concentrated on large energy users or broad conservation measures) while EES focused on small-scale users and, often, alternative technologies. That distinction has become blurred in recent years.

Current submeasures for KECP during the current year include:

- State facilities -- recordkeeping (\$24,000)
- State facilities audits (\$10,000)
- Lighting/thermal standards (\$8,000)
- Education - S.W.A.T. Jr. (\$13,700)
- Education partnerships (\$20,000)
- Pooling and public transportation (\$2,800)
- KEC - programmatic (\$157,000)

The S.W.A.T. Jr. program (Students Weatherization and Training) is a program in which high school students are trained to identify and correct low-cost/no-cost conservation measures in their schools. The education partnership program, which is run through the State Department of Education, awarded 18 grants to public and private K-12 schools. Each school applies for partnership to work with a local utility or coal company or university to study energy use during the school year. The KEC programmatic submeasure includes a wide range of conservation activities, including emergency preparedness, water conservation programs, energy studies, videotapes, and general education.

The KEC is also proud of their efforts in getting donated materials (primarily caulk) from industries and distributing it to WAP subgrantees, community groups, senior citizen centers, and even organizations in other states.

The 20 percent state match for KECP is an in-kind match, meaning that the salaries and overhead of regular state personnel, as well as some salaries of subgrantees and contractors, are used to meet the federal match requirement.

PROGRAM: Kentucky Energy Extension Service (EES)

Other names: Energy Extension Service (EES) -- national name
Energy Management Assistance Program (EMAP) -- former name

1. **State administering agency:** Division of Conservation, Department of Energy Production and Utilization, Kentucky Energy Cabinet
2. **Federal oversight agency:** U.S. Department of Energy
3. **Local administering agency(ies):** None, although contracts are awarded to various public agencies, nonprofit organizations, and private consultants for local projects, studies, etc.
4. **Program goals:** To provide small-scale energy users with personalized information and technical assistance to facilitate energy conservation and the use of renewable resources.
5. **Target audience:** Varies depending on specific program goals within wide range of diverse and innovative services (see item 13).
6. **Specific limits/priorities:** N/A
7. **Legislative authority:** National Energy Extension Service Act of 1977
8. **Current year funding and source(s):¹**

\$ 64,400	Federal grant
\$158,424	Carryover
<u>\$ 12,880</u>	State match
\$235,704	Total

9. Budget History²

FFY	Grant	State	PVE	Other	Total
88	66,400	13,280			79,680
87	121,400	24,280			145,680
86	160,600	32,120			192,720
85	167,300	33,460			200,760
84	110,764	22,153			132,917

¹ Budget documents provided by Tom Hanna, KEC, and then extrapolated to Pendragon format for comparison purposes.

² Source: Budgets and allocations figures have been provided by KEC. It should be noted that the grant cycles do not conform exactly with the federal fiscal year, but KEC staff indicated that they were reasonably close.

10. **Spending History¹**

FFY Total Expenditures

88	110,386
87	78,742
86	112,019
85	49,424
84	88,421

11. **Average cost per client served:** N/A. See the comments on item 11 in KECP.
12. **Energy savings per client served, as estimated in response to federal/state reporting requirements:** See the comments on item 12 in KECP.
13. **Other considerations/comments:**

Like KECP, its sister program, KEES includes a number of submeasures; while KECP can change submeasures annually, KEES operates under a three-year plan. The current KEES submeasures and their funding for the current year are:

- Administration/Monitoring (\$38,380)
- Seniors (\$50,000)
- Nonprofit Organization Assistance (\$33,000)
- Commercial/Small Business (\$5,000)

Administration/monitoring includes the salary, fringe benefits, overhead, and miscellaneous expenses of one full-time coordinator. The senior citizens programs have two separate components: SWAT-1 and SWAT-2 (SWAT stands for Seniors Weatherization Assistance and Training in both cases). SWAT-1 is basically a low-cost/no-cost education program aimed at seniors.

SWAT-2 has evolved from a program called PILIRR, which stands for Partnerships in Low-Income Residential Retrofit Programs. As such, it began as a separately funded 18-month pilot program from DOE. (It was one of five innovative programs chosen out of 35 proposals, which DOE funded in individual states as a way of determining whether it might be successfully used elsewhere.) PILIRR, while not a weatherization program, nor equivalent to GEER, served low-income elderly persons (both homeowners and renters) by developing partnerships with private sector organizations (e.g., utilities, churches, senior centers) and by training seniors to

¹ Source: *Ibid.* Note, however, that the allocations often lag behind appropriations (a common occurrence for most SEOs), meaning that the carryover for each year is quite substantial. This is reflected in item 8, but not in item 9. One can take the totals in item 9 and subtract the expenditures in item 10 to determine the carryover for each subsequent year.

help themselves and each other install conservation measures. When the pilot program ended, it was redesignated SWAT-2. SWAT-2 is still identical to PILIRR and separate from SWAT-1 in that it goes beyond educational tips and offers financial incentives in the form of loans to implement energy conservation measures.

The nonprofit organization assistance works with community groups and United Way agencies to help them conserve energy, and the commercial submeasure provides videotaped training on conservation for small businesses.

The 20 percent state match may be a cash or in-kind contribution.

PROGRAM: Kentucky Energy Savers Fund (KESF)

Other names: HUD Solar Bank -- national name

1. **State administering agency:** Division of Conservation, Department of Energy Production and Utilization, Kentucky Energy Cabinet (KEC)
2. **Federal oversight agency:** U.S. Department of Housing and Urban Development (HUD)
3. **Local administering agency(ies):** N/A
4. **Program goals:** To encourage energy conservation through the use of solar energy and thus to reduce national dependence on foreign energy sources. It accomplishes this through subsidized loans or matching grants for energy conservation improvements or solar energy systems.
5. **Target audience:** Low- and moderate-income owners and renters of residential, agricultural or commercial buildings (agricultural and commercial owners/renters must be non-profit) that qualified according to income eligibility.
6. **Specific limits/priorities:** Recipients of loan subsidies must have an annual family income of 150 percent or less of the median area income. Recipients of grants must have an annual family income of 80 percent or less of the median area income.

The eligible modifications and improvements were also spelled out; one list specified eligible measures for one-to-four family residential buildings, and a second list spelled out eligible measures for multifamily residential, agricultural, commercial, and industrial. Each proposed measure had to meet cost-effectiveness criteria, such that active solar energy installations rarely qualified under the criteria, while more traditional energy conservation measures (insulation, caulking, storm windows, etc.) and passive solar systems (including sunspaces) were more routinely approved.

7. **Legislative authority:** The Energy Security Act of 1980
8. **Current year funding and source(s):** None.
9. **Budget History¹**

FFY	Grant	State	PVE	Other	Total
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¹ Correspondence with Donald J. Challman, Fund Manager, KEC. It should be noted that HUD did not appropriate the funds on a fiscal or calendar year basis, and thus these figures are not exact.

88	21,200	21,200
87	56,700	56,700
86	62,800	62,800
85	282,100	282,100
84	250,183	250,183 ¹

10. Spending History

Although this information is available, it would take a great deal of time since it would require looking at each individual file to determine when the check was sent. Also, the loans and grants to recipients may have been approved, and thus encumbered, during one fiscal year, even though the work was not completed, and thus the expenditures were not made until a later year. It is reasonable to assume that the spending roughly followed the HUD appropriations.

11. **Average cost per client served:** This is an awkward distinction, since the combined single-family/multifamily nature of the program means that many more families and individuals might be served than can be known by the number of applications, or projects served. KESF offers a conservative estimate of 4,000 people served (based on number of applications and Kentucky's average of 2.3 persons per household).

For the cumulative totals ending June 30, 1988, 1739 applicants were funded in 760 projects. The total cost to the Solar Bank was \$1,043,502 in subsidies, with \$3,361,247 in leveraged funds, thus totalling \$4,404,749. This last figure, divided by 1739 separate loans and/or grants suggests that \$600 in government funds, and a total of \$2,533 in public and private funds, was spent on each conservation improvement.² Leveraged funds varied depending on whether the applicant was initiating a conservation measure or a solar project. For conservation measures, leveraged funds were \$4.63 to every HUD dollar, while for solar projects, leveraged funds were \$2.50 to \$1.00 (solar applicants though received 50 percent funding).

12. **Energy savings per client served, as estimated in response to federal/state reporting requirements:** The most recent cumulative report estimates that 61,218 MBtu have been saved over the life of the program. Using the same inexact assumptions as were used earlier, this would equate to 35 MBtu saved per conservation improvement. KESF also estimates an average savings of \$9.00 per MBtu.³ Note that several improvements could be contained within a single project.

¹ The citation for 1984 is, in particular, an approximation. A total of \$750,548 was appropriated over three years, from 1982 through 1984. We have simply divided that number by three, for use as a comparison to other programs and to other years for the same program.

² Source: Summary Sheet for Semi-Annual Reports, KESF

³ Ibid., as well as correspondence between Donald J. Challman and The Pendragon Group.

13. **Other considerations/comments:** Because this was primarily a loan program, with a grant program for those in lower-income brackets operating within it, it is not easily compared to the other conservation activities. While detailed "hard data" is available, it is not reported in a way that can be readily compared to other programs.

Funding from HUD for this program has ended, and it is up to Congress whether to continue this program or not.

PROGRAM: Low-Income Home Energy Assistance Program (LIHEAP)

Other names: Home Energy Assistance Program (HEAP)

1. **State administering agency:** Department of Social Insurance (DSI), Cabinet for Human Resources (CHR)
2. **Federal oversight agency:** U.S. Department of Health and Human Services (HHS)
3. **Local administering agency(ies):** The "subsidy" or "regular" program (which serves elderly and handicapped only) is administered through local DSI offices, which are located in all counties. The "crisis" or "emergency" program is funded through the Kentucky Association of Community Action Agencies (KACA), which passes through the funds to Community Action Agencies (CAAs) which are usually the same as the local subgrantees that manage the WAP programs.
4. **Program goals:** Provides low-income households assistance to meet home energy needs through cash assistance and other emergency actions (e.g., fix broken heating components).
5. **Target audience:** The "subsidy" program serves low-income elderly and handicapped persons only; the "crisis" program serves all other low-income households.
6. **Specific limits/priorities:** 1) Applicants must apply for funds within proper time frame, and 2) their gross income must be at or below 110 percent of the poverty level.
7. **Legislative authority:** Low-Income Energy Assistance Act of 1981
8. **Current year funding and source(s):**

\$ 18,902,451 Federal grant
3,163,000 PVE
202,714 Carryover
\$ 22,268,165 Total

9. Budget History¹

FFY	Grant	State	PVE	Other	Total
88	20,930,148		1,025,000	462,571	22,417,719
87	24,906,471			222,545	25,129,016

¹ Source: HEAP Budget and Expenditures by Component (FFY 1982 - FFY 1989), as well as conversations with Clifford Jennings, DSI.

86	28,183,302	503,704	28,687,006
85	29,141,451	696,492	29,837,943
84	28,329,438	2,447,362	30,776,802

10. Spending History

FFY	Subsidy	Crisis	WAP	Other ¹	Total
88	4,957,243	10,512,922	3,139,522	5,158,952	23,768,639
87	10,548,616	6,071,250	3,688,794	4,731,381	25,040,041
86	15,241,890	5,333,936	2,502,108	5,799,835	28,877,769
85	14,714,889	5,034,884	3,788,389	5,595,791	29,133,953
84	20,655,470 ²		3,839,380	4,969,416	29,464,266

11. Average cost per client served: \$105.18

12. Energy savings per client served, as estimated in response to federal/state reporting requirements: N/A

13. Other considerations/comments: Although this is reported as if is one program, it more closely resembles two programs, since the two components are administered by different agencies at the local level. Funds are divided between the subsidy program (approximately 1/3rd of the total) and the crisis program (nearly 2/3rds). The emergency program begins taking applications on a specified day each year, which is colloquially known as "crisis" day since so many people apply on the basis of their impending crisis.

In 1988, and again in 1989, DSI has also put aside \$300,000 for emergency crises assistance. The criteria for help is simply that the clients' heat has been turned off and the emergency funds are used to restore service.

LIHEAP has the option of using up to fifteen percent of their funds for innovative conservation purposes to aid the low-income sector. Usually, DSI has simply passed through most or all of this amount to the WAP program managed through DES. In some years, however, DSI has kept some of the money and sponsored DSI-funded conservation initiatives, including Project WARM in its early years, and, more recently, GEER.

¹ Includes administrative funds, funds for emergency cooling and preventative assistance programs, as well as a ten percent transfer to the social service block grant.

² Prior to 1985, funds were not broken into subsidy and crisis, but were simply referred to energy assistance; this figure therefore contains the total for both funds.

PROGRAM: Residential Conservation Service (RCS)

1. **State administering agency:** Public Service Commission (PSC)
2. **Federal oversight agency:** U.S. Department of Energy
3. **Local administering agency(ies):** None, although local "covered" utility companies are responsible for providing services. "Covered" utilities are large public and investor-owned utilities, both electric and gas. By federal mandate, smaller utilities and other suppliers are not required to participate in the program.
4. **Program goals:** To audit single-family homes and multifamily apartments, and to make recommendations on the cost and savings of appropriate energy improvements.
5. **Target audience:** Homeowners, residents, and owners of apartment buildings. Because only those "covered" utilities are required to provide services, not all areas of the state are served. In fact, there are an estimated 1,050,866 eligible customers, of which 179,045 are believed to be "double counted," i.e., receiving service from more than one utility. Assuming 1,200,000 households out of a population of 3,400,000, the PSC believes that approximately 72% of the state's population are reached. This does not include those served by TVA in the 26 western counties of the state, which are also served by RCS.
6. **Specific limits/priorities:** Only "covered" (i.e., large electric and gas) utilities are required to provide audit services, and the requirement that utilities participate is by PSC directive. They can charge no more than \$15 per audit. Because of a sunset provision in the federal legislation, utilities are not required to continue the RCS program after June 30, 1989, but the PSC commissioners will probably address the question of continuance in the near future.
7. **Legislative authority:** The Conservation Service Reform Act of 1986 has extended this program through 1989.
8. **Current year funding and source(s):** There is no direct federal funding for the program. Although KECP could provide funding for the program, it has consistently chosen not to. Utilities are required to provide services, and are allowed to recover the costs (over and above the \$15 fee) from the general rate base. The PSC costs for administering the program between April 1, 1987 and March 31, 1988 were estimated at \$45,000, which was in PSC funds. The utilities reported costs were \$136,987 for the same period.¹
9. **Budget history:** N/A

¹ RCS Annual Report: April 1, 1987 to March 31, 1988

10. **Spending History:** N/A
11. **Average cost per client served:** The covered utilities performed 704 audits during the same reporting period, at an estimated cost of \$181,987 to both the state and the utilities. This results in a cost of \$258.50 per audit. When the additional \$15/audit charge is added, the total figure becomes \$273.50.¹
12. **Energy savings per client served, as estimated in response to federal/state reporting requirements:** The most recent annual report estimated 9,563 MBtu for the entire program, based on utility company projections.
13. **Other considerations/comments:** The program officially ends on June 30, 1989. Federal legislation to continue the program is unlikely; however, there is a reasonable expectation that the PSC will continue the program with the utilities' cooperation.

¹ This seems to be an unusually high cost compared with the cost/client in other states, however, owing to the fact that considerable overhead costs are realized regardless of the number of audits performed. (For example, RCS programs in rural areas or in states with very low participation rates show much higher average costs per audit than the national average.) According to Sarah Kirchen, Program Manager, Residential and Commercial Conservation Program, DOE, the national average for an RCS audit is \$102. She indicated that the \$100 average is for an ongoing program; it does not include initial costs for starting a program. Evaluations of RCS costs for start-up and ongoing administration averaged approximately \$175/audit.

PROGRAM: Weatherization Assistance Program (WAP)

1. **State administering agency:** Department for Employment Services (DES), Cabinet for Human Resources
2. **Federal oversight agency:** U.S. Department of Energy (DOE)
3. **Local administering agency(ies):** 25 local subgrantees, of which 22 are Community Action Agencies (CAAs); the other three are local governments
4. **Program goals:** Generally speaking, the WAP goal is to "weatherize," i.e., reduce energy consumption by making energy-efficient improvements, to existing residential buildings of low-income persons. Specifically, the law defines the goals as:
 - 1) To reduce the nation's demand for energy and petroleum imports;
 - 2) To cushion the adverse impact of high energy costs among low-income consumers, particularly among the elderly and handicapped; and,
 - 3) To increase job opportunities and national economic output.
5. **Target audience:** Low-income (specifically 125 percent of federal poverty level), with priority given to elderly and handicapped
6. **Specific limits/priorities:**
 - 1) Each subgrantee (i.e., CAA or local administering agency) is restricted to an average expenditure of \$1,600 per residential unit. A residential unit can be a single house, a mobile home, or an apartment. The maximum per-house expenditure, without prior state approval, is \$2,000. This is a DES stipulation.
 - 2) No more than 15 percent of WAP clients may be renters. This is a state-imposed limit.
7. **Legislative authority:** Energy Conservation and Production Act of 1976, as amended by the National Energy Conservation Policy Act of 1978, the Energy Security Act of 1980, and the Human Services Reauthorization Act of 1984.
8. **Current year funding and source(s)¹:**

\$ 3,101,814 DOE
\$ 2,388,000 PVE (Exxon)
\$ 3,139,522 15 percent contribution from LIHEAP

¹ Both this and item 9 reflect funds available in each program year; these are not always synonymous with state or federal fiscal years.

\$ 8,149,336 Total

9. Budget History

FY	Grant	PVE	Other ¹	Total
88	3,028,548	2,933,000	3,139,522	9,101,070
87	3,101,814	615,889	3,688,794	7,406,497
86	3,547,391		2,502,108	6,049,499
85	3,898,126		3,788,389	7,686,515
84	4,473,457		3,839,380	8,312,837

10. Spending History

FFY Total Expenditures

88	9,086,084
87	7,405,737
86	6,017,141
85	7,351,597
84	7,754,768

- 11. Average cost per client served:** Dividing the total costs (including state and local administrative costs), the average estimated cost per unit weatherized in FY 89 is \$1715.28.
- 12. Average energy savings per client served:** Unknown. (See Section 3.7 for a discussion of this issue.)
- 13. Other considerations/comments:** The Division of Employment Services must submit an annual plan to the DOE that indicates the funding and the number of units that are expected to be weatherized. In the most recent submission, dated September 1, 1988, DES anticipated weatherizing a total of 4,751 units and serving 13,540 persons. Of the last number 20.8 percent were elderly, 15.8 percent were handicapped, and the remainder were low-income.

A major component is the training of the local crews that perform the weatherization services. DES has contracted with the Kentucky Association of Community Action Agencies (KACA) to provide training and technical assistance. KACA usually gets about five percent of the DOE portion of the WAP budget, translating into \$160,000 to \$170,000 annually to provide the training.

¹ This amount is the LIHEAP 15% weatherization transfer, in which the LIHEAP program, at its discretion, can transfer up to 15 percent. DSI has not always chosen to make the full transfer of eligible funds to DES.

Representative Samples of Private/Local Efforts

Private-sector groups involved in energy conservation include those utilities which operate RCS, and a number of private, non-profit organizations involved in small-scale outreach programs. Since the RCS program has been described earlier (and because the activities of each utility are prescribed by law, thus leaving no room for variation), it is not included here.

Other private-sector efforts include church-sponsored programs to provide low-cost/no-cost services and/or dollars to those who qualify. Very often, these are unfocused programs, in that they can give donated materials to needy families, while not being able to coordinate a total retrofit and education package that would improve the living quarters in a long-term and significant way.

One exception seems to be Project WARM, a Louisville-based effort which began (and still continues) as a private-sector low-cost/no-cost project, but which has since expanded its services and is an official WAP subgrantee. Project WARM is discussed in Section 3, since it is integrally tied to WAP in the Louisville area. Nonetheless, because of the interest in this public-private partnership, it is explained in greater detail than some other community-based efforts which may provide similar services but have not yet generated the public interest and financial support available to Project WARM.

The Tennessee Valley Authority's conservation efforts are outlined in broad terms, but because of recent restructuring and cut-backs, they may not be as major a factor in Kentucky's future conservation efforts.

Without comprehensive surveying and analysis of all of Kentucky's private-sector efforts, it is inappropriate to generalize on the basis of a few rather diverse programs. However, the responses to our questionnaires and the answers provided during our state-level interviews leads us to the opinion that, in the main, the private-sector activities in Kentucky are laudable and helpful, but not equivalent to such programs in some other states. Although speculative, we are inclined to believe that this is do to the pro-production philosophy and the lack of any current or anticipated shortages (notably in electric generating capacity, since this is commonly encourages conservation programs elsewhere).

Nonetheless, the programs described in the following pages do suggest that there are community groups and utilities interested in working to reduce the burden of energy costs upon low-income persons. It seems reasonable to presume that better coordination between WAP, LIHEAP, GEER, and privately sponsored programs would provide fruitful results.

Private program/organization: Christian Appalachian Project

1. **Sponsor:** same
2. **Address:** 322 Crab Orchard Road
Lancaster, Ky. 40444
3. **Telephone:** (606) 792-3051
4. **Target audience:** Low-income households of Appalachia in Kentucky
5. **Program goals:** The overall program is an outreach program offering a wide variety of services, including daycare, emergency services for food, clothing, energy bills. The Home Repair Program includes weatherizing homes along with general home repair.
6. **Geographic area:** CAP covers all Appalachia, including parts of 17 counties in Kentucky
7. **Limitations:** The annual family income of households served usually ranges from \$4,000 to \$7,000, but there is no fixed formula for determining need. Help is generally offered at the discretion of the field person and done in the order of applications as they are received.
8. **Funding for last five years:** The entire Project operates under a budget of approximately \$20,000,000 annually. The Home Repair Program has operated under the following budget figures, but note that these figures cover work from minor repairs to rebuilding, as well as weatherizing work.

FY 88	\$247,655 ¹
FY 87	\$300,768
FY 86	\$285,740
FY 85	\$190,000
FY 84	\$190,000
9. **Source of funding:** Ninety percent of funding comes from individual donations which are requested six times per year in direct mail appeals. The remaining ten percent is usually funded through various grants from local governments or through Cabinet for Human Resources.
10. **Coordination with WAP/LIHEAP/RCS:** There is occasionally some cross-matching of clients, but contact is slight.

¹ This reflects a reduction in the work force.

Private program/organization: Dow Corning Corp.

1. **Sponsor:** N/A
2. **Address:** 760 Hodgenville Road
Elizabethtown, KY 42701
3. **Telephone:** (502) 737-6466
4. **Target audience:** N/A
5. **Program goals:** To distribute caulking material to organizations involved in providing weatherizing services to low-income, elderly, or handicapped persons
6. **Geographic area:** Statewide, as well as other states in the Southeast
7. **Limitations:** Donated with the understanding that product will be used by those who would be unlikely to purchase caulking material on their own.
8. **Funding for last five years:** Dow measures their contribution in pounds of caulking material (product is approximately \$5 per pound). Over last three years, Dow has contributed 350,000 pounds of caulking material; using ten pounds per household, the caulking material roughly has reached 35,000 needy households in Kentucky.
9. **Source of funding:** Corporate donation
10. **Coordination with WAP/LIHEAP/RCS:** The Kentucky Energy Cabinet serves as clearinghouse for Dow in distributing the caulking material. KEC coordinates the orders and directs Dow to ship it directly to users, primarily CAC's involved in weatherization programs.
11. **Comments/other:** In 1986, Dow was invited to contribute caulking material through a SWAT program which was operating in a local district; that first year, Dow contributed 10,000 cartridges for the local program. In 1987, the KEC provided state-wide distribution of approximately 60,000 cartridges. More recently, Dow has donated approximately 250,000 pounds of a high-performance caulking product which did not meet Dow's expectations and marketing plans.

Private program/organization: Kentuckians for the Commonwealth

1. **Sponsor:** N/A
2. **Address:** 425 West Mohammad Ali Blvd.
Suite 328
Louisville, KY 40202
3. **Telephone:** (502) 585-3279
4. **Target audience:** Program aimed at persons and households living at or below 150 percent of poverty level; often directed at renters who are not served by public weatherization programs.
5. **Program goals:** To provide first-line weatherizing services -- caulking, weather-stripping, plastic over windows.
6. **Geographic area:** Jefferson County
7. **Limitations:** Materials are limited to approximately \$75 per household and program is restricted to no cost/low cost measures.
8. **Funding for last five years:** This is a new program operating with a budget of \$7,000.
9. **Source of funding:** Cumberland Savings and Loan donated the total budget.
10. **Coordination with WAP/LIHEAP/RCS:** Louisville's Project WARM contracts with this group to address needs of renters who often cannot be adequately helped through public programs. Winterhelp and Metro Human Needs Alliance also provide referrals to Kentuckians for the Commonwealth.

Private program/organization: Kentucky Power Company

1. **Sponsor:** N/A
2. **Address:** 1701 Central Ave.
Ashland, Ky. 41101
3. **Telephone:** (606) 327-1111
4. **Target audience:** Households identified by local CAC as needing basic no/low cost weatherizing.
5. **Program goals:** To provide volunteer labor for weatherizing low-income homes.
6. **Geographic area:** KPC covers 20 counties in eastern and southeastern Kentucky.
7. **Funding for last five years:** N/A
8. **Source of funding:** N/A
9. **Coordination with WAP/LIHEAP/RCS:** Worked closely with local CAC's in identifying clients.
10. **Comments/others:** KPC organized their volunteer effort in 1986 and 1987; it is not an on-going project. In 1986, they recruited 200 volunteers, primarily KPC employees, to weatherize approximately 100 homes, in cooperation with local CAC's. In 1987, KPC participated in SWAT, weatherizing 30 homes through the program.

KPC saw some problems in coordinating which houses to work on because of overlapping public programs; there was also some talk (after the fact) of work being taken away from contractors because of volunteer efforts. Nonetheless, KPC saw value in simply developing empathy on the part of employees for problems facing many low-income clients.

KPC also established a Neighbor Helping Neighbor Program in 1983. They provided \$10,000 in seed money in getting the program started and matched donations that first year, dollar for dollar. Private donations totaled approximately \$11,000, a figure which KPC matched. This program was changed into Wintercare the following year. KPC continues to support Wintercare through advertising within their billing process.

Private program/organization: Project WARM

1. **Sponsor:** Urban Shelter Associates
2. **Address:** 1252 S. Shelby St.
Louisville, Ky. 40203
3. **Telephone:** (502) 635-7288
4. **Target audience:** Low-income households, as determined by standard DOE guidelines, specifically those below 125 percent of federal poverty level, with priority given to elderly and handicapped.
5. **Program goals:** To provide low-cost weatherization measures to low-income households.
6. **Geographic area:** Jefferson County
7. **Limitations:** Project WARM follows DOE guidelines, except in using volunteers to install plastic over windows for elderly and handicapped.
8. **Funding for last five years:**

	Operating grant	Materials	Labor	Total
FY 89	\$50,000	\$65,000	\$180,000	\$295,000
FY 88	\$50,000	\$65,000	\$135,000	\$250,000
FY 87	\$50,000	\$45,000	\$109,000	\$204,000
FY 86	\$50,000	\$25,000	n/a	\$ 75,000
FY 85	\$50,000	\$25,000	n/a	\$ 75,000

9. **Source of funding:** Project WARM receives two operating grants each year for \$25,000 from the City of Louisville and Jefferson County. These grants cover administrative cost, including rent, printing, postage, and administrative salaries. In addition, Louisville Gas and Electric Co. pays for weatherization materials, which are bought in bulk. Since 1986-87, Project WARM has been the sole source sub-contractor for all weatherization done through the City of Louisville and Jefferson County. Their staff of eight installers and one coordinator is paid on an hourly rate with WAP funds.

10. **Coordination with WAP/LIHEAP/RCS:** The City of Louisville and Jefferson County handle the application process, inspections, and contracting out more expensive work such as insulation and door and window replacement.

11. **Comments/other:** WARM started in 1981 as a three-way partnership between local governments, the local utility company, and a large volunteer force. The local governments put up the operating funds, the utility company supplied materials, and approximately 300 volunteers offered labor in providing low/no cost weatherizing, specifically caulking, weatherstripping, and plastic over windows.

Project WARM won a federal award for "Innovations in Energy" from DOE in 1984.

There were many problems coordinating this effort with the local CAC, and the CAC eventually lost the contract to provide service in 1986. At that time, Project WARM became the sole source sub-contractor for weatherization work provided by the city and county. They hired workers and shifted from their volunteer emphasis. Project WARM still uses approximately 80-90 volunteers per year to install plastic over windows in the homes of elderly and handicapped (this measure does not fall within acceptable DOE guidelines for weatherization work because of its temporary nature).

From the beginning, WARM has offered their volunteers the incentive of receiving free weatherizing materials for their own homes when they have contributed 20 hours of service.

Project WARM is generally pleased with the degree of cooperation between the various parts of the program, but there is some concern that the application process has slowed down getting the weatherizing services to the low-income households they serve. When they were primarily a volunteer force, they would average about 1,000 calls a year for assistance. Now with the city and county taking the calls and applications, there is concern that their crews will not enough work. Part of the problem is simply that the city and county are understaffed to do intake; the other factor is that the application process is more difficult and the applicant's paperwork must be in order before service. Project WARM has recently been trying to advise clients before they make application for service about what sort of information they need for the intake people.

Private program/organization: South Louisville Community Ministries

1. **Sponsor:** N/A
2. **Address:** 801 Camden Ave.
Louisville, Ky. 40215
3. **Telephone:** (502) 367-6445
4. **Target audience:** Low-income persons of all ages.
5. **Program goals:** To provide cash assistance for emergency heating needs.
6. **Geographic area:** The South Louisville Community Ministries is one of thirteen ministries working within Jefferson County. The groups have divided the area by Zipcode, with the South Louisville group serving 40209, 40214, 40215, and 40218.
7. **Limitations:** No set criteria is applied; assistance is offered at the discretion of the social worker.
8. **Funding for last five years:** Unavailable; however, according to testimony by the Metro Human Needs Alliance when testifying at rate increase hearings by local utilities, the total funding for heating assistance by private agencies in Jefferson County in 1983 was \$24,676 for 415 households. This group testified that in 1987, total funding for heating assistance by private agencies in Jefferson County was \$207,000 for 7,160 households.
9. **Source of funding:** Church contributions
10. **Coordination with WAP/LIHEAP/RCS:** The Community Ministries generally refer people to both the WAP and LIHEAP programs for their assistance. They will apply for LIHEAP funds for seniors who need assistance. Their emergency funds are generally called upon when public aid has run out or for those not eligible for public funds.

Private program/organization: Tennessee Valley Authority

Sponsor: N/A

Address: 700 Hammond Plaza
Hopkinsville, Ky. 42240

Telephone: (502) 887-2142

Target audience: Audiences have varied according to specifics within the range of TVA programs.

Program goals: In the past, TVA programs have ranged from weatherization for low-income households to no-interest loans for weatherizing projects to experimental solar building construction.

Geographic area: TVA operates in southwest Kentucky in approximately 30 counties.

Funding for last five years: N/A

Source of funding: Funding measures have varied according to program specifics.

Coordination with WAP/LIHEAP/RCS: TVA has trained many of the people who work in local CAC's carrying out weatherization projects. There were problems in recent years in coordinating the TVA efforts towards weatherization of low-income homes with work being done through WAP by CAC's. The problems, which grew out of differences between TVA and DOE guidelines and failure to communicate, became a moot point when TVA stopped their energy audit program and weatherization efforts within the last eight months.

Comments/other: TVA has undergone a massive reorganization and shifting of focus within the past eight months. Data on various programs has been scattered and a large number of programs have been dismantled. In the past, TVA played a major role in promoting energy conservation through its weatherization programs, loan programs, and demonstration projects, but with their recent lay-offs and cut-backs, they will be a lesser presence in ongoing conservation projects. Several people in separate interviews remarked on TVA's new emphasis on "marketing" energy rather than involvement with energy conservation.

In recent years, TVA has offered a variety of programs addressing energy conservation in both the residential and commercial sectors. Because TVA operates in several states lying within the Tennessee Valley, breaking out statistics relating just to Kentucky is problematic and is even more complicated in view of the recent TVA reorganization. TVA offered free energy audits in their entire service area and estimates that they did energy audits on approximately one million homes in the Tennessee Valley. They estimate that they eventually weatherized between 50 to 75 percent of those homes and that, valley-wide, 30 percent of those served were low-income households. In providing weatherization services for low-

income homes, TVA worked with local CAC's (not always successfully) and often provided training programs for local weatherization workers. TVA has stopped providing energy audits and weatherization activities in Kentucky. While they still provide homeowners free energy audits in Tennessee, they will probably start charging for this work, which in the words of one TVA employee, will probably "spell the death of the program."

Within the past year, another program which offered no-interest loans for heating equipment has been phased out. Up to \$1,200 interest-free could be obtained for purchasing heat pumps, wood heaters, sunscreens, and solar water pumps. An additional \$3,800 in loans was available (at the cost of borrowing plus one percent) for similar equipment. TVA still offers some loan programs for electrical heating equipment (again, the new emphasis is on marketing TVA energy).

Other past programs have included public education projects, such as an energy display at the visitor's center at Land Between the Lakes in southwestern Kentucky. The education models there displayed information and examples of passive solar design, wind energy turbines, and energy efficient lighting systems.

Another example of experimental energy work involving TVA was a joint project between TVA, the Methodist Church, and assistance in the form of federal grant money from DOE to construct a solar, multifamily apartment complex for the elderly in Benton, Kentucky. TVA was involved in designing Lakeland Wesley Village, the low-rise complex which relied on an atrium space to be used as a solar collector, as well as public space for the residents. TVA finished its part of the program after doing the performance monitoring in 1982 after the building was opened. Between 1979 and 1988, TVA provided approximately \$325,000 in loans for seventeen energy efficient developments in the commercial/industrial sector in Kentucky.

Private program/organization: Wintercare

1. **Sponsor:** The Wintercare Energy Fund, in cooperation with 32 regulated and unregulated utility companies
2. **Address:** P.O. Box 11610
Lexington, Ky. 40576
3. **Telephone:** (606) 233-4600
4. **Target audience:** Low-income households which are at or below 150 percent of poverty level.
5. **Program goals:** Provides low-income households with cash assistance to meet home energy needs.
6. **Geographic area:** Statewide program, operating in 119 out of 120 counties (the exception being Jefferson County which is served by a similar program, Winterhelp).
7. **Funding for past five years:**

FY 88	\$265,859
FY 87	415,328
FY 86	164,333
FY 85	187,358
FY 84	76,416
8. **Source of funding:** Funds are raised through utility rates and direct contributions from utility customers.
9. **Coordination with WAP/LIHEAP/RCS:** All clients are referred to WAP. The program is complementary with LIHEAP, often given on top of LIHEAP assistance.
10. **Comments/other:** All clients are referred to local WAP program for service.

APPENDIX B:

A BRIEF HISTORY AND ALLOWABLE USES OF PVE FUNDS¹

Called by various names, several large reserves of money from court and DOE settlements are providing states with billions of dollars for a wide range of "energy-related" activities. The process by which this money has come to the states is a fascinating one -- both in terms of the history of the oil overcharge cases, and in the interrelationships between federal and state agencies and the courts. The process of distributing these awards to the states has nudged open a Pandora's box of legal and political issues, in which Congress, DOE, and many states sometimes disagree on the allowable uses and appropriate oversight of these oil overcharge monies, more formally known as Petroleum Violation Escrow (PVE) funds.

From the standpoint of public fiscal policy, the use of oil overcharge restitution funds may be one of the most fascinating, perplexing, and precedent-setting chapters in federal-state relations. The major issue is a profound one -- is this federal money, or is it state money? Technically, it is neither. It is trust money provided by the courts to the states to be used for the citizens of those states. In fact, the only trust fund of equivalent size is social security and, except for being a trust fund, social security and oil overcharge settlements bear little in common.

Because these funds were provided to the states by different courts and different times, the allowable uses of these funds can vary. One theme holds: these are restitutionary funds to remedy financial injuries done to the general consumer. Beyond that, there is great variety. What is acceptable as a remedy in one case is expressly disallowed in another. Further, the role of DOE in approving states' proposed uses will vary, depending upon the overcharge fund. *Thus, Kentucky policymakers need to consider the funding source (e.g., Exxon, Stripper Well, OHA -- all of which will be explained later) in selecting program initiatives.*

Although most of the funds have been distributed to the states, a moderate amount is still forthcoming. Specifically, DOE estimates that \$80 million will be sent to the states on April 6, and another \$545 million (from the Texaco settlement) should be forthcoming over the next five years. Total future disbursements can only be guessed at; DOE's guess is that \$600-800 million will be sent to the states

¹ Adapted (with revisions and updates) from a book by Felicity W. Evans, An Analysis of Oil Overcharge Refunds to States, Pasha Publications, 1987.

over the next five years.¹

The following sections explore the history of the major settlement cases, and the roles of the different agencies in DOE, Congress, the courts, and, of course, the states as they have tried -- separately and together -- to provide answers to these questions. They are organized as follows:

1. The Early History
2. The "Warner Amendment" Funds
3. Exxon: The Billion-Dollar Bonus
4. Refined Product Cases: OHA Establishes the Two-Stage Approach
5. Stripper Well and Diamond Shamrock
6. DOE's Monitoring and Oversight Responsibilities

Outline: Examples of OHA-Approved State Restitutionary Programs

1. The Early History

In 1973, after the Arab countries imposed an oil embargo to the U.S. and oil prices rose dramatically, Congress passed the Emergency Petroleum Allocation Act (EPAA), which established priorities and procedures for fuel allocation and price controls. Its stated purpose was to ensure adequate supplies, reasonable prices to consumers, and a fair return to domestic energy companies. While EPAA may have done that, it was more commonly (although perhaps unjustly) credited with having caused the massive gasoline lines of 1974.

Up until early 1981, only a few of the state energy offices (SEOs) and other state agencies that would eventually profit from the billions in new-found revenues had any idea of the pot of gold that would soon come their way.

The entire issue of oil overcharges and restitutionary arrangements is an arcane one, for many reasons. Several different divisions and agencies within DOE, as well as numerous courts throughout the nation, have been involved in determining the eventual use of overcharge funds; these agencies and courts have spent many years in deciding the various cases, nearly always overlapping each other. Additionally, there are numerous types of regulations which can lead to overcharges, namely:

- 1) crude oil;
- 2) crude oil resales;
- 3) natural gas liquid products (NGLP), some of which come from gas wells and some from refinery byproducts;

¹ Conversation with Thomas Mann, Deputy Director, Office of Hearings and Appeals, DOE.

- 4) refined petroleum products (RPP), such as gasoline, kerosene, fuel oil, and diesel fuel, which are sold by refiners;
- 5) RPP sold by jobbers;
- 6) RPP sold by retailers, e.g., gas stations; and
- 7) entitlements -- the regulations designed to ensure adequate supplies and a fair return on investment to all parties in the energy supply and distribution business.

For most purposes, these categories are often lumped together into the overall grouping of "crude oil" and "refined products," since the legal procedures and restitutionary elements are similar. In dealing with refined product overcharges, specific companies and groups -- such as airlines, trucking companies, and electricity suppliers -- can often show that they were directly and adversely affected by the higher rates. For example, an electric utility with records providing that it brought fuel oil to generate electricity from a company that was later found to have overcharged its product, was reimbursed as a "direct claimant" for the difference between what the utility paid (the overcharged amount) and what it should have paid (the legally allowable amount). These "directly injured individuals," or "direct claimants" are given first priority in being recompensed for whatever direct damages can be proven.

Although there may be a few direct claimants in crude oil cases, the major problem in this category is in determining restitution, i.e., who was hurt by the pricing violations, since all users of all oil and gasoline products felt the impact of the overcharge. Stated more simply, how can the the government or the courts determine injury when all consumers were overcharged?

While the idea of rebating every crude oil user in the country might seem attractive on first blush, the value of sending checks for between \$.80 and \$.90 to each homeowner or driver is clearly unacceptable when one considers the cost to the federal treasury of processing a given check. Thus, the concept of "indirect restitution" for crude oil overcharges came into being. Under this principle, the settlement amounts are collected by the government and channeled through programs that will help all consumers. Naturally, there is much dispute over which level of government should be given decision-making authority over the billions of dollars involved and how one defines and selects programs that help all consumers.

DOE's Economic Regulatory Administration (ERA) is responsible for administering and overseeing the price regulations; it also has authority to investigate and rule on pricing violations. The ERA process for investigating and ruling on alleged violations is complicated, but not unlike other administrative law procedures. The overall procedure by which alleged violations were pursued was, and is, as follows:

- 1) a violation was noticed -- either by the DOE on-site auditors at the 34 major refiners or by another member of the ERA Office of Enforcement in

response in random sample testing, a reported violation, or special reviews in response to volumes sold.

2) ERA issued a notice of probable violation (NOPV). The company responded to the NOPV and, if it agreed with the ERA charges, a settlement between ERA and the company ensued.

3) if no settlement was forthcoming, ERA issued a "proposed remedial order" (PRO) to the company, which could appeal the PRO to the DOE Office of Hearing and Appeals (OHA).

4) OHA adjudicated the PRO and issued a "remedial order" (RO).

5) if the company disputed the OHA's RO, it could appeal to the Federal Energy Regulatory Commission (FERC), which heard the case and issued a FERC decision.

6) if the company disputed the FERC decision, it would challenge the decision in U.S. District Court.

Whenever a settlement is arranged, it becomes a "DOE consent order," and is published in the Federal Register. Prior to decontrol, the resulting settlements often required that a company which had overcharged its product by X cents or dollars per unit was required to undercharge an equivalent amount of product by an equivalent amount of money. Other arrangements included company payments to the Federal Treasury, to consumer groups, for environmental purposes, and, beginning in 1981, to state governments.

The first inkling of the billion-dollar windfall came for most states in the fall of 1981, when they were notified that Chevron had signed a consent order concerning violations of both crude oil and refined product regulations. In October, ERA and Chevron reached a settlement on the amount of past violations, agreeing in the order what the restitution would be. After all of the specifically injured parties were recompensed for some of the RPP violations, there was still a sizable amount that was, presumably, owed the general public.

ERA and Chevron agreed that Chevron would repay \$25 million in RPP overcharges to state governments, for their use in general restitution to individuals in their states. Chevron agreed to pay to the U.S. Treasury the amount of overcharges regarding its import license allegations and to deliver crude oil to the Strategic Petroleum Reserve for its crude oil production overcharges.

The governors were sent a letter advising them of the funds they would be receiving and the allowable uses of those monies. Specifically, the \$25 million was prorated to each state based on the amount of product sold in that state, such that California received \$6.6 million, while Minnesota, Wisconsin and many other states received nothing.

ERA encouraged the states to develop programs which would provide restitution to the "injured persons," i.e., the residents and/or motorists that had

paid too much for the heating oil, gasoline, and diesel oil purchased when Chevron had violated the pricing restrictions. Since the amounts were too little to provide direct restitution to each "injured person," a precedent was set which allowed states to develop programs which generally would help all citizens within that state. Chevron specifically allowed states to spend the money on programs for such purposes as:

- highway and bridge maintenance and repair;
- ridesharing;
- public transportation;
- building energy audits;
- grants or loans for weatherization and energy conservation equipment installation;
- energy assistance programs;
- airport maintenance and improvement;
- reduction in airport user fees; and/or
- energy conservation or energy research offices and administration.

Although this list was sufficiently general to allow considerable state discretion, ERA encouraged states to develop consumer-based, citizen-wide, energy conservation and efficiency programs. There was at least a presumption that the state should spend its share of funds in accordance with the type of Chevron product sold in that state, e.g., Chevron overcharges from heating oil sales should be used in building conservation programs, and gasoline-based overcharges should be used for transportation-related programs.

The consent order between ERA and Chevron also determined that the various states would spend the money in accordance with the nine categories listed above, but that Chevron itself would approve the states' use of funds and mail out checks directly to the states. In short, DOE never disbursed the funds nor specifically authorized the states' use of those funds. Although the DOE Office of the Special Counsel reviewed the states' submittal letters and consulted with Chevron prior to the release of funds, Chevron, not DOE, had authority over the states' use of restitution funds.

While most states were fairly judicious in using the Chevron funds for conservation-related and consumer restitution purposes, some states were "unusually creative" in finding programs on which to expend Chevron monies. A General Accounting Office (GAO) report compiled two years after the expenditure of Chevron funds pointed to some questionable uses of the funds by a few states, including basic and applied research in Pennsylvania, airport improvement projects in Georgia, and research into enhanced oil recovery and classification of lignite deposits in Texas.

The same process was used for two other overcharge cases that were decided in 1981. In one case, Corco -- a Puerto Rico-based refiner that operated solely in that commonwealth -- agreed to pay \$10 million in damages, of which \$3 million was designated for the island's public electric utility company and the remainder to the state. (In fact, Corco is currently in bankruptcy proceedings and still owes \$1.5 million to the Puerto Rico. It is not clear how that problem will be

resolved.)

In another instance, Sohio was required to pay \$10 million to 20 states for refined product overcharges during the 1970s. In that consent order with Sohio, no stipulations were made on how the money should be used; rather, the states were required to put share into the state's general treasury, on the presumption that general tax mitigation provided adequate indirect restitution to citizens and that the state legislature could determine an appropriate use.

2. The "Warner Amendment" Funds

It is important to remember that, throughout 1981 and 1982, numerous oil overcharge cases were proceeding through the courts, and hundreds more were being pursued through ERA administrative procedures. Prior to the Chevron disbursement, ERA had been grappling with the difficult legal issues of "indirect restitution." Lacking much guidance from Congress or DOE superiors, ERA had chosen to distribute relatively small amounts of money to charities and other groups.

After the Chevron, Sohio, and other ERA consent orders, GAO and other interested parties questioned whether some of the ERA distributions were in the best interests of the general public that had been injured in the first place. They urged more control and assurance that restitution funds would be used to help those who had paid too much for heating oil and/or transportation fuels.

It was in this context that the Senate Appropriations Committee, looking for ways to augment the state energy conservation activities while still meeting budget reductions urged by President Reagan, noted that ERA was possibly "sitting on" millions of dollars in restitution funds. After consulting with ERA and various public interest groups, Sen. John Warner (R-Va.) proposed that those funds collected by ERA, but not needed as compensation to direct claimants, be distributed to the states for their use in the five state energy conservation programs. These included:

- the State Energy Conservation Programs (SECP), which include energy-efficiency programs in buildings, transportation, agriculture, industry, and numerous other activities;
- the Energy Extension Service (EES), which provides technical assistance to small-scale energy users, such as homeowners, renters, small businesses, and local governments;
- the Institutional Conservation Program (ICP), which offers matching grants for technical assistance and energy-conserving capital improvements in schools and hospitals;
- the Weatherization Assistance Program (WAP), which provides for installation of energy-conserving home improvements among the low-income and elderly;

- the Low-Income Home Energy Assistance Program (LIHEAP), which helps low-income users pay their fuel bills.

The first four of these programs are managed by DOE's Office of State and Local Assistance Programs (OSLAP) within the Office of Conservation and Renewable Energy. The fifth is managed by the Department of Health and Human Services. All were planned for extinction by the Reagan Administration, but they were very popular among community groups, state governments, and the Congress.

When Congress investigated the number of cases already prosecuted or settled by ERA, it appeared that approximately \$200 million was available for "indirect restitution," i.e., the difference between the agreed-upon settlement with various oil companies and the amount likely to be allocated to direct claimants. Accordingly, Warner introduced, and both houses eventually passed -- as part of the supplemental appropriation bill in December 1982 -- a provision by which \$200 million would be allocated to states as though it were federally appropriated funds.

This meant that, with a few minor exceptions, all of the legislative and regulatory provisions that applied to appropriated funds in the five allowable programs also applied to any state's use of its share of the \$200 million. In short, states would need to submit detailed plans and proposed budgets, and must comply with approved contracting procedures and reporting requirements as though the money were part of the programs' annual appropriations. The only exception was that the newly required 20% state match for SECP and EES was waived for the "Warner Amendment" funds; the required 50% match for ICP still held, however.

Additionally, no "Warner Amendment" funds could be used for administrative expenses. These costs, which ranged from 5% to 20%, depending upon the program, could come from the regular federal appropriations or state coffers. Unlike the Chevron funds, proposed uses for Warner Amendment funds must be approved in advance of their expenditure by the states.

These monies became officially known as "Section 155," from the section in Public Law 97-377 in which they were authorized, and "Petroleum Violation Escrow (PVE)" funds, since they were part of the overall DOE escrow fund which was now being distributed through OHA. While some use PVE as the designator for all overcharge funds, it technically applies only to those consent orders litigated by ERA with settlement amounts distributed and managed by OHA.

3. Exxon: The Billion Dollar Bonus

The ERA case against Exxon alleged that Exxon had overcharged its crude oil sales by approximately \$900 million by mislabeling oil extracted from Exxon's Hawkins Field site as "new oil," when it was in fact "old oil." ERA and Exxon had not been able to agree, and therefore no consent order was forthcoming;

Exxon thus proceeded to challenge FERC's decision with the U.S. District Court in the District of Columbia. On March 25, 1983, after several years of litigation, Judge Flannery decided that the government was right and that Exxon was wrong; Flannery also determined that the provisions of the recently passed Warner amendment provided an appropriate remedy to the general public. For the states' purposes, this meant that Exxon (with \$2 billion total) was equivalent to Warner Amendment funds (with \$200,000 total); anything that was allowable with Warner, was allowable for Exxon. Basically, it meant that:

- 1) states could spend the money on the five allowable programs only;
- 2) states must conform with all rules and requirements of the programs to which the Exxon funds were dedicated.

In short, the requirements imposed on states in spending Exxon funds are relatively rigid.

4. Refined Product Cases: OHA Establishes the Two-Stage Approach

While the Exxon and Warner Amendment issues concerning crude oil restitution were being resolved in the courts and Congress, refined product cases -- including Palo Pinto, Amoco, Northeast Petroleum, and Coastal Petroleum -- were also being prosecuted by ERA. In some of these cases, there was no issue of liability; the company admitted that the product was wrongly priced. Rather, the problem was who was injured and how to compensate them.

Once liability was resolved in an ERA consent order, the case was referred to OHA to settle actual restitutionary elements and procedures under so-called Subpart V procedures from the section of the regulations where they are found (10 C.F.R., Part 205, Subpart V). After grappling with the legal issues for a lengthy period -- as will be seen in the Stripper Well cases -- OHA developed a two-stage process, in which direct claimants are compensated first, and the remaining amount is distributed to states for indirect restitution to all consumers.

In the case of Amoco, for example, the company agreed to damages of \$105 million. OHA proceeded with a two-stage approach: it published a notice in the Federal Register indicating that possible claimants should present evidence that they were injured by Amoco's pricing actions and that their injuries resulted in damages of so many dollars. Many parties came forward to show specific injuries, including airlines, interstate trucking companies, etc. (It is much easier to trace purchasers of refined products than it is to determine injuries attributable to crude oil violations, due to the fact that crude oil overcharges are effectively shared by refiners as a result of the "entitlements" allocation program. Furthermore, there are fewer "middlemen" in the process and the distribution is more geographically limited.) After a predetermined period, OHA determined the validity of the alleged injuries, processed checks to recompense those directly injured, and then refunded the remainder, i.e., the "second stage restitution," to states. For Amoco, this meant that approximately \$24 million was distributed to the states for indirect restitution to consumers.

The OHA-managed distributions established a new procedure for states. In the Chevron consent order, states wrote directly to Chevron ensuring their compliance with the approved uses in the consent order; for the Warner amendment, states complied with the elaborate planning, budgeting, and reporting requirements established in the regulations of the five allowable programs. DOE's Office of State and Local Assistance Programs (OSLAP) approved and monitored states' use of Exxon funds as though they had been Congressionally appropriated.

For the OHA agreements -- called variously "OHA 2nd Stage" or "OHA Subpart V," -- states were required to submit plans to OHA, and they were not given the money until OHA approved their plans. The states were not restricted to the five approved programs in the Warner Amendment, but the specifics of the allowable expenditures were never formalized. They were sometimes quite general (e.g., for "energy-related programs") and often varied according to the particular consent order. Nonetheless, the overriding principle was restitution to the general public.

5. Stripper Well and Diamond Shamrock

Although the "Stripper Well" agreement is usually described in the singular, the court decision actually included 42 separate cases that were eventually consolidated into one. The "Stripper Well Case" was not decided until the summer of 1986, but some of the actual cases were first prosecuted in 1977.

"Stripper" wells are those small domestic wells that produced less than 10 barrels of crude oil per day; they were exempted from the price controls in effect until January 1981. In filing suit against specific companies, ERA alleged that these companies produced more than 10 barrels of oil per day from such wells, and the prices were therefore not exempt from controls.

When the Stripper Well case was brought before Judge Frank Theis, of the U.S. District Court in Wichita, Kansas, the issue was not simply company liability, but rather, how much compensation should be given, and to whom. Several of the companies that were joined as defendants in the case had already put the disputed amount in a court-managed escrow account. States competed with the federal government, utilities, airline users, barge operators, agricultural cooperatives, gasoline retailers, and numerous other users of crude oil products in claiming their eligibility for restitution.

In September 1983, Theis asked OHA to engage in factfinding concerning whether any of the supposed direct claimants could prove actual injury. After requests for comments and public notices, OHA found itself besieged with over 100 responses from various states, refiners, utilities, airlines, and other possibly injured parties. OHA then held public hearings between June and September of 1984. These lasted 22 days, becoming a high-stakes battle between the lawyers and their expert witnesses, the economists. Sixty-four organizations and 30 lawyers and expert witnesses joined OHA in creating 13,000 pages of written or oral presentations. OHA summed up its months of hearings and study as follows:

Finally, there are two other classes of purchasers who were affected by the MDL overcharges. These are (1) resellers of petroleum products, and (2) consumers of petroleum products who purchased products from a reseller. The evidentiary record which forms the basis for this report does not permit the OHA to make findings of fact about the impact of the MDL 378 overcharges on these two classes.

In short, Judge Theis would have to make up his own mind, without help from OHA, on how best to compensate the consumer. OHA had shown that at least 91.9% of the original overcharges at the well had been added to the price, over and over again -- to the refiner, the wholesaler, the utility, the airline, the farmer, etc. -- until finally, the consumer paid it.

In addition to the formal OHA report, DOE issued a "statement of restitutionary policy," which recommended that funds be held in escrow until Congress had an opportunity to decide appropriate restitution. If Congress could not decide the matter, DOE recommended that the money be given to the U.S. Treasury, since it was clearly impossible to determine any particular claimant's injury. Perhaps most importantly, DOE urged that this proposed policy be used for all crude oil violations. DOE came under immediate attack, and the District Court in Kansas was besieged with applications for intervention from numerous groups that had previously not been involved. Congressman John Dingell (D-MI), Chairman of the Subcommittee on Oversight and Investigations of the House Committee on Energy and Commerce, also became involved, writing detailed letters to Judge Theis and others with his recommendations and insights.

Fearing that DOE and Congress would jointly engineer an arrangement by which the entire windfall would simply be placed in the federal treasury, a number of the groups that had participated in the court proceedings informed Theis that they were attempting to work out a compromise among themselves. After Theis indicated that he would reject any settlement to which DOE was not a party, DOE undertook to begin negotiations with states and other parties to the litigation on how crude oil violations in general, and Stripper Well cases, in particular, should be distributed.

By January 1986, a memorandum of understanding between the various parties was reached; a settlement agreement was then prepared to define the parties' rights and obligations. DOE signed the settlement agreement on May 21, and it was presented to Judge Theis the next day. He issued his decision on July 7, and states began to receive checks in August.

The Stripper Well Settlement, which governs all future crude oil disputes -- including the multibillion dollar Texaco refund -- is as follows. Those groups of claimants that had participated in the proceedings thus far were each allocated a certain amount, in return for waiving all future claims to crude oil refunds. The amounts owed them would be given in two increments: at the time the agreement was approved and one year later. The remainder of the money would be divided equally between the federal and state governments. In crude oil cases other than

stripper well, a portion of the overcharge not to exceed 20 percent is made available to claimants who can demonstrate injury, and the remainder is split between the states and DOE.

States received over \$1 billion already, and can expect another \$1.5 to \$2.5 billion over the next several years. They must report annually to both the court and DOE on all actual and planned expenditures with the money. However, states have discretion to use the funds on a much wider selection of "energy-related" programs than those in Warner and Exxon, including:

- the nine eligible uses cited in the Chevron case;
- the five eligible programs cited in the Warner Amendment and again in the Exxon decision; and
- any approved use in any case handled by OHA.

The only limitation in this rather liberal set of allowable uses is that states can spend no more than 5% on administrative expenses. Legal expenses incurred in the Stripper Well litigation can qualify within the overall administrative expense guideline, and, in fact, some states have used the majority of their administrative allocation on legal fees.

Finally, Stripper Well administrative fees can be used to manage Exxon-funded programs, except that states must not exceed the 5% overall cap. If states chose this option, however, legal expenses stemming from the Exxon decision cannot be reimbursed from Stripper Well awards.

One of the more interesting aspects of some states' use of Stripper Well funds is that they are designating various proposed projects as allowable uses under "Chevron" or "OHA," even when the programs are clearly identifiable as "OSLAP-type" programs, i.e., they seemingly qualify among the five federally appropriated programs. As will be noted, the states have good reason for defining their programs by the more liberal designation.

As Stripper Well was winding its way through OHA and the District Court of Kansas, the Diamond Shamrock case was being heard by the U.S. District Court for the Southern District of Ohio, Eastern Division. Amoco was one of the original companies involved in the Stripper Well case, while Diamond Shamrock was one of several purchasers of Amoco's crude oil; it claimed that it had paid too much for Amoco's oil because of Amoco's stripper well violations. The Diamond Shamrock Refining and Marketing Co. was joined by 15 other refiners that had purchased Amoco oil, including such well-known firms as Arco, Mobil, Exxon, and others.

Just days prior to the Kansas District Court's Stripper Well decision, Judge Joseph Kinneary in Ohio accepted a settlement along lines very similar to the Stripper Well settlement. (In fact, the Stripper Well agreement had been approved by all parties, but the actual Stripper Well court case had not been finally settled.) After the plaintiffs had received their share, the remainder was divided between

the federal and state governments, with states receiving \$48 million.

Allowable programs for Diamond Shamrock are identical with those in the Stripper Well agreement. One of the attachments to the court ruling offered the following list of approved uses; it was followed by legal citations for each entry that indicated when such a use had been previously allowed by OHA. These are provided on page XX, at the end of this Appendix.

One big difference in the ruling is in the allowable administrative and legal expenses. States can use their entire Diamond Shamrock refund for administrative expenses for all crude oil award programs, provided that it does not exceed 5% of all crude oil awards. Further, Diamond Shamrock can be used to pay legal expenses, just as though it were any other administrative expense. Many states used Diamond Shamrock funds to reimburse lawyers for expenses incurred in other crude oil cases, since legal fees were not covered in Exxon and only partially allowed in Stripper Well.

What is important for legislators to know is that the allowable uses for Stripper Well and Diamond Shamrock awards are much broader than that for Exxon funds.

6. DOE's Monitoring and Oversight Responsibilities

Just as ERA is responsible for litigating claims, and OHA is charged with distributing the awards, DOE's Office of State and Local Assistance Programs (OSLAP) is in charge of monitoring states' use of some PVE funds. OSLAP was first given this authority for the Warner Amendment funds, since four of the five allowable programs -- SECP, EES, ICP and WAP -- fall under its review. The fifth program, LIHEAP, is administered by the Department of Health and Human Services (HHS), which is responsible for monitoring states' use of oil overcharge funds dedicated to that program.

OSLAP's task is not an easy one. Each state is organized differently, such that various state agencies manage different OSLAP/HHS programs. Further, the arrangements between the Governor and legislature in each state vary, meaning that there may be states in which no one individual or office knows everything that is going on. The designated individual for one settlement award is not necessarily the designee for another award; sometimes they are not in the same agency or department.

Perhaps the biggest problem is reporting. States are required to follow strict federal guidelines on procurement, fiscal accountability, and reporting activities on appropriated funds -- but not necessarily on overcharge funds. In the early days, some states (and some federal program managers) did not really know what they could, could not, must, and must not do with restitutionary funds.

Possible misunderstandings about what states must or must not report are only the first of DOE's monitoring problems. OSLAP is responsible for reviewing states' use of expenditures under the SECP, EES, ICP, and WAP programs. OHA is responsible for monitoring states' activities that fall within the Chevron- and

OHA-approved uses -- but their procedures are far less stringent.

For example, when a state submits a WAP, SECP, EES, or ICP plan on the use of federally appropriated as well as overcharge funds, it must itemize the exact uses of the money, the staff that will be dedicated to the project, the percent of time that each staff person will spend on that program, and the proposed contractors and the contract amounts. Additionally, the DOE Support Offices managers that oversee the OSLAP projects conduct annual on-site monitoring visits for each state in the region; they are prepared with detailed checklists on procurement procedures, fiscal reporting, technical capabilities, and more. These procedures are based on the regulatory requirements for the four OSLAP grant programs, as well as other stipulations governing the use of federal grant funds.

OHA, on the other hand, requires a statement on how the money will be used, and OHA approves or disapproves that proposed use before issuing a check to the state. Once the state has the money, there is no on-site monitoring; the only review is conducted two years after disbursement, when OHA reviews the reports that are required to be submitted by states on how they actually spent the money.

In other words, there are two major distinctions between the "OSLAP-type" oil overcharge funds and the "OHA-type" oil overcharge funds: namely, the OHA funds (which also include the ERA consent orders) offer much greater flexibility in the use, while simultaneously providing limited DOE oversight of state activities. Several states have taken advantage of the distinctions. With Stripper Well and Diamond Shamrock funds, states can decide into which "group" their proposed programs fall, i.e., "approved under Exxon," "approved under Chevron," or "approved under OHA," with the latter two treated almost identically. (With Warner and Exxon funds, states had no choice: Congress and the court respectively required that states use these funds in accordance with the OSLAP and LIHEAP programs.)

Thus, Illinois has requested DOE to approve a proposed use of \$30 million in Stripper Well funds under the "OHA" guidelines, even though it is an institutional grant program very similar to the current ICP program. By doing so, states can avoid the detailed monitoring by the OSLAP support office and headquarters staff, while also maintaining flexibility in the program. In Illinois' case, for example, it can continue to provide 50-50 matching grants to most schools and hospitals that conform exactly with the current ICP guidelines, while also providing 100% grants to small or economically depressed institutions. These institutions have not participated in the ICP program in the past because they were unable to provide any match whatsoever, and it is questionable whether or not they would participate in an energy management program other than a 100% grant. Using the OHA guidelines, rather than the OSLAP/ICP regulations, Illinois is able to develop a program that requires matches from large and fiscally sound institutions while allowing for grants to those less fortunate.

In what some state lawyers believe is both excessive and unsupported by the Stripper Well Agreement, OHA has chosen to become more rigorous in approving states' applications for Stripper Well and Diamond Shamrock money.

Specifically, they are imposing the concept of "timeliness," (which in fact is not new, and stems from the Exxon decision requiring states to provide "timely" restitution to injured consumers) and "balance." By balance, OHA means that the proposed uses of the funds provide reasonable balance between all injured consumers -- not just the low-income, or industry, or whatever, to the exclusion of all others. Within these two caveats, states have wide discretion to undertake consumer-based conservation programs.

A chart indicating the OHA-approved past uses of overcharge, as cited in the Diamond Shamrock Agreement (and as applicable to all current and future Stripper Well funds, provided the proposed uses are "timely" and "balanced") is provided below.

EXAMPLES OF OHA-APPROVED STATE RESTITUTIONARY PROGRAMS

I. TRANSPORTATION

A. General Driving Public

1. Fuel efficient traffic signal programs
2. Highway traffic management programs
3. Motor fuel and recycling programs
4. Highway and bridge maintenance and repair
5. Public transportation projects

B. Consumers

1. Car care clinics
2. Energy education for drivers training
3. Ridesharing programs
4. Marketing of state supported passenger rail and mass transit

C. Commercial, Industrial, Government

1. Vehicle fleet maintenance programs
2. Transportations systems management assistance
3. Re-manufacturing/re-fitting transit buses
4. Computerized school bus routing
5. Alternative transportation fuel programs
6. Transit system re-fitting loan program

II. RESIDENTIAL

A. Heating

1. Weatherization
2. Retrofitting
3. Tune-ups
4. Energy audit
5. Energy assistance
6. Demonstration projects
7. Data collections and dissemination
8. Energy management services
9. Conservation promotion programs
10. Solar energy demonstration programs
11. Solar energy lending programs

B. Electricity

1. Weatherization
2. Energy auditing
3. Energy assistance
4. Promotion of high-efficiency appliances
5. Demonstration projects

III. COMMERCIAL

A. Industrial/Agricultural

1. Energy loans
2. Energy assistance
3. Conservation
4. Biomass conservation

B. Small Business/Government/Education

1. Energy accounting incentives
2. Loans and technical assistance
3. Energy audits
4. Energy efficiency
5. Cogeneration

APPENDIX C

FIELD VISITS AND INTERVIEWS

A. On-Site Visits to WAP Subgrantees

Audubon Area Community Services, Inc.
P.O. Box 630
Owensboro, KY 42302-0630

Blue Grass Community Action Agency, Inc.
Paul Sawyer Park, Versailles Road
Route 3, U.S. 60
Frankfort, KY 40601

Community Action Lexington-Fayette Co.
P.O. Box 11610
Lexington, KY 40576

Gateway Community Services Organization, Inc.
P.O. Box 36
West Liberty, KY 41472

Kentucky River Foothills Development Council, Inc.
P.O. Box 743
Richmond, KY 40475

Lake Cumberland Community Services Organization
P.O. Box 505
Somerset, KY 42501

Leslie, Knott, Letcher, Perry CAC, Inc.
HC 32, Box 2150
Red Fox, KY 41847

Licking Valley Community Action Program, Inc.
203 High Street
Flemingsburg, KY 41041

Middle Ky. River Area Devel. Council, Inc.
P.O. Box 255
Breathitt County Courthouse
Jackson, KY 41339

Southern Kentucky Community Action Agency, Inc.
P.O. Box P
Bowling Green, KY 42102-4924

West Kentucky Allied Services, Inc.
P.O. Box 736
Mayfield, KY 42066

City of Louisville
Dept. of Housing & Urban Development
745 West Main Street
Louisville, KY 40202-2633

Jefferson County
Community & Neighborhood Development Dept.
710 West Main, First Floor
Louisville, KY 40402-2634

B. On-Site State-Level Interviews

Department for Employment Services, Cabinet for Human Resources (Pat Bishop, Bill Hayden, Betty Miller, Glenna Reed, Floyd Day)

Department of Social Insurance, Cabinet for Human Resources (Sharon Perry, Clifford Jennings)

Department of Energy Production and Utilization, Kentucky Energy Cabinet (Lana Rogers, Tom Hanna, Jim Noland, Tom Challman, Tom Griswold)

General Assembly (Mary Lynn Collins)

Kentucky Association for Community Action, Inc. (Jesse Amburgey, Butch Quire)

Kentucky Housing Corporation (Beccy Prather)

Legislative Research Commission (Joe Fiala, Mary Yeager, Matt Patrick)

Public Service Commission (Bob Johnston)

APPENDIX D

SURVEY QUESTIONNAIRE

The survey questionnaire can be found on the following pages. It was mailed to all 25 WAP subgrantees. All but one returned the questionnaire, although one did not provide complete data for the ten most recent completions.

PART A: PROJECT OPERATIONS

Agency Name:

Address:

Contact Person:

Telephone:

- (1) How do you get the actual weatherization work done? (Check one)

- _____ (a) In-house crews only
_____ (b) Contractors only
_____ (c) A mix of in-house crews and contractors

If you answered (c), who does what kind of work?

We use crews for _____

We use contractors for _____

- (2) Altogether, we have _____ crews working out of _____ offices.

- (3) How many employees do you pay out of the WAP budget? (Exclude bookkeeping and clerical work charged to the "5 percent for administration," but include any other employees charging 25 percent or more of their time to WAP. If necessary, show "full-time equivalents," -- e.g., "crew members 4.75.")

_____ Weatherization coordinator
_____ Inspector(s)/field supervisor(s) not assigned to a single crew
_____ Crew members, including foremen working regularly on-site
_____ Other (explain: _____)

_____ Total employees

- (4) The hourly wage we pay our *crew members* ranges from \$_____/hour (lowest paid) to \$_____/hour (highest paid).

- (5) What amount are you using for average program support costs this program year? \$_____
What was it during the preceding program year? \$_____

- (6) How do you buy most of your materials? (check one)

_____ Not applicable; we use private contractors.
_____ We order all materials by the individual job.
_____ For expensive items like windows and doors, we put out bids on several jobs at a time, batched together.

Agency name _____

_____ We buy insulation in bulk (and/or other standards materials like caulk) and store in a warehouse, buying other materials by the job or in small batches.

Other comments (if needed to clarify answer): _____

- (7) (a) Does your agency administer the LIHEAP crisis program?

_____ yes _____ no

- (b) During the past 12 months, have you received a printout (or other referrals) from the "regular" (elderly and handicapped) LIHEAP program?

_____ yes _____ no

- (8) For your agency's **10** most recent completions (the same as for Part B. below), how many fall into each of the following categories?

_____ "Regular" (elderly and handicapped) LIHEAP clients
_____ "Crisis" LIHEAP fuel program clients
_____ Not LIHEAP clients
_____ Can't determine from application forms

_____ **10+** (Total may exceed 10 if some are both "regular" and "crisis")

- (9) For each of these LIHEAP programs, which of the following statements most nearly describes how LIHEAP clients are referred to WAP? (Check only one in each column. You may need to check with the LIHEAP director for this information.)

"Crisis"	"Regular"	
_____	_____	No special efforts are made to refer LIHEAP clients to WAP.
_____	_____	LIHEAP staff ask clients if their home has been weatherized; if not, the client is told how to apply to WAP; the rest is up to the client.
_____	_____	For homeowners, or those with priority status, we help them apply for WAP when they apply for LIHEAP.
_____	_____	WAP staff go over the LIHEAP rolls periodically and contact eligibles in priority categories.

Other comments (if needed to clarify answer): _____

- (10) (a) What percentage of rental units did you complete last program year? _____%

- (b) If you agency had total discretion in the number of rental units weatherized, how many would you complete?

_____ fewer _____ about the same as now _____ more

Agency name _____

- (11) Which, if any, of the following methods of client education has your project used within the past 12 months?
(Check as many as apply.)

_____ Nothing with any regularity, except answering client questions.
_____ We make a routine practice of having the crew chief or inspector talk to clients about maintenance and other energy-saving practices.
_____ We make a routine practice of leaving pamphlets or other printed materials with clients whose houses have been weatherized.
_____ We show videos, films, or have Q&A sessions with groups of clients.
_____ We sponsor (or coordinate with other answers) programs teaching people how to install and use no-cost/low-cost measures.

- (12) Which of the following assessment/evaluation techniques has your project used within the past 12 months?
(Check as many as apply.)

_____ We monitored before-and-after fuel use on a sample of houses.
_____ We used a blower door to get an estimate of before-and-after infiltration.
_____ We asked clients to fill out a form on their satisfaction with our work.
_____ We surveyed clients for feelings about comfort or savings.

_____ Other (explain): _____

- (13) Are there any privately sponsored programs in your service area involved in residential energy conservation? (Examples: a church-sponsored volunteer program to help people install low-cost conservation measures; a utility, college, or nonprofit organization that assists people in conservation or alternative energy techniques; a service club or business group that solicits donations of weatherization materials.) If so, please list below (and on extra pages if needed) whatever information you have readily available about them; do *not* make a research project of this.

_____ None, to our knowledge.
_____ Yes, as follows (to the extent you have information available):

Name of group: _____

Address: _____

Contact person: _____

Telephone: _____

Type of work they do: _____

Degree of contact with WAP: _____ none _____ slight _____ close

Agency name _____

PART B: INFORMATION ON TEN (10) MOST RECENT COMPLETIONS

	1	2	3	4	5	6	7	8	9	10
File number:	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Single house, duplex	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Mobile home	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Apartment, 5+ units	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Primary heat (enter code below)	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Secondary heat (enter code)	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
NG = natural gas; EL = electricity; WD = wood; CO = coal; KE = kerosene; LP = LP gas; FO = fuel oil										
Owner-occupied	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Rented	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Total occupants	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Elderly/handicapped	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Materials cost	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Total cost	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

Please put a check in the appropriate column if the cost of materials for that item was \$65.00 or more.

New doors (incl. hardware)	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
New windows	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Other infiltration-stopping	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Attic insulation	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Wall insulation	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Floor insulation	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Wrap heat ducts/pipes	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Heating system tune/repair	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Trailer underpinning (skirting)	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Roof repairs	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Other: _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Other: _____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

How many new doors and/or windows were installed? (Enter "0," "1," "2," etc.)

Doors	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Windows	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

COMMENTS (either general or keyed to file number): use back or extra page(s) if necessary.

PART C: PROGRAM SUGGESTIONS

- (1) Are there any technical priorities (on weatherization measures) you feel should be changed? If so, what are they, and why should they be changed?
- (2) Are there any other WAP policies, priorities, or practices you would like to see changed? What and why?
- (3) Is there anything about the State monitoring procedures you would like to see changed? What and why?
- (4) Do you have any suggestions for improving training, (e.g., subject matter, format, frequency)?
- (5) If you were responsible for both WAP and LIHEAP, how would you improve coordination between the two programs?
- (6) What would you do to improve coordination between WAP and privately sponsored efforts?

* * * * *

Thank you for your time and trouble. Please return this questionnaire by February 28, 1989. Use the enclosed self-addressed envelope, or mail in a separate envelope to:

*The Pendragon Group
10111 Colesville Road, Suite 107
Silver Spring, Maryland 20901*

APPENDIX E

A REVIEW OF OTHER STATES' ACTIVITIES

TO: Joe Fiala
Legislative Research Commission

FROM: Felicity Evans

RE: Sample Energy Management Activities in Other States

DATE: May 31, 1989

You have asked that I compile a brief description of some of the more innovative energy management programs in other states that might be appropriate for further research by Kentucky policymakers. As we discussed by phone, I am somewhat hesitant to put together such a listing, since it might be misconstrued as a recommendation that Kentucky undertake a similar activity. Or, a reader might assume that a program would not be included in such a list unless it were a "good" program; but since we have not conducted an evaluation of these programs, we cannot state that they are, in fact, good programs, only that they seem promising. Thus, readers might presume two things: first, that these are good programs, and secondly, they will work in Kentucky. We do not wish such presumptions to be made without having evaluated the programs in their other locales, and also researched their possible usefulness in Kentucky. Finally, there is so much information on these subjects, that no one government agency or private organization can keep up-to-date on these programs, even though they may be funded to track these projects on a full-time basis.

With these caveats in mind, however, there are a number of activities underway in other states that might be usefully copied, and we are happy to provide a list of representative activities that appeal to us. At some point, Kentucky might wish to conduct a full-fledged feasibility study of one or more of these projects, but, prior to that, literature searching and telephoning to the various state program managers is appropriate; the place to begin such searching is probably with the Division of Conservation.

We have arbitrarily chosen to focus on non-weatherization and generally non-low-income activities, since those were covered fairly thoroughly in the evaluation itself. For example, integrating utility audits and financial assistance into the weatherization program has been done by a number of states, and such linkages could be considered in Kentucky. Thus, we have chosen to highlight programs focusing on the middle-income residential, institutional, and commercial

sectors. There are also a number of exciting activities in the R&D and industrial sectors that might be appropriate for Kentucky but are beyond our knowledge or expertise, and several innovations in the transportation area that seem best suited for large urban states. We have also concentrated our list on those activities that are generally lower cost, and/or serve a large number of people, rather than large financial outlay projects, such as district heating or resource recovery demonstration grants. Finally, we have included only projects underway in several states, since their apparent usefulness and transferability is already presumed.

We hope the following list is helpful as a way of showing the considerable range of activities in other states. While most of these programs are supported by oil overcharge funds, some use state monies or federally appropriated funds.

1. Revolving Loan Funds -- A number of states have low-interest revolving loans, or a combination of loans and grants, available for conservation improvements in the residential, agricultural, institutional, and/or industrial sectors. In New Hampshire, homeowners can borrow up to \$5,000 to implement energy improvements; this is typical of similar programs in many other states (e.g., Iowa, Georgia, Wisconsin, Minnesota, Maryland, Connecticut, Ohio, North Carolina, Washington, New York) directed at homeowners.

Some states also provide loans to developers for low-income housing retrofits, and some use these funds to match utility contributions for weatherization. Some states provide grants as well as loans, or some combination thereof, for those individuals who qualify on economic grounds.

A large number of states also provide loan and grant funds to small businesses, schools, hospitals, nonprofit organizations, local governments, and/or state agencies. Some of these will be highlighted in sections covering technical assistance to the given target sectors.

2. Technical/Financial Assistance to Non-Profit Organizations -- The Alliance to Save Energy, often working with United Way of America and/or local utility companies, has conducted technical assistance programs for social service agencies in a large number of states, including Kentucky, Nevada, New Jersey, Florida, and Virginia.

The Nonprofit Energy Conservation Project has worked with New York, Georgia, Michigan, Ohio, and Texas to provide energy outreach services to nonprofit organizations. Massachusetts have developed a package of technical services to help organizations formulate and implement conservation programs, including help with developing a plan, training programs, operations and maintenance practices, and financing.

3. Technical/Financial Assistance to Schools -- One of the most popular state activities is to provide handholding and technical services that are far more substantive than those traditionally allowed under the current Institutional Conservation Program (ICP). This is because many states believe that by serving government agencies and schools, they can simultaneously reduce energy costs of participating institutions while also reducing the financial burden of all taxpayers.

Texas, for example, offers complete one-stop shopping, "handholding," and on-site assistance services to its 1100 local school districts, through the state Energy Management Center (EMC). Under this program, EMC works with the school district by providing free architectural and engineering services, assistance with administrative tasks (such as school board resolutions), information exchange, and evaluation. The information exchange includes quarterly meetings and newsletters to keep school district personnel informed of new developments. The state has also developed its "performance auditing" tool, which looks at management actions that can encourage or discourage sound energy management practices.

During FY 1988, \$255,000 was dedicated to the primary component of EMC, the onsite energy evaluation program. They served 129 individual school campuses in 63 school districts during that period. (Since the beginning of the project in 1985, they have served 817 facilities in 500 school districts.) State officials estimated that this generated \$2,346,000 in savings just last year -- or \$9.20 in savings for each \$1.00 spent. The average savings per facility were \$18,126, but one large school district has saved \$417,000 annually.

Texas has recently established a new program to help school districts design more energy-efficient new schools and major retrofits. They have also received approval to develop a revolving loan fund of \$98.6 million, which will be allocated as follows: state agencies (including state-owned universities) - \$48 million; local governments and public schools - \$25 million each.

Other states that provide extensive technical and/or financial assistance to schools include California (which provides on-site professional engineers and a total of \$520,000 in loans), Iowa, New York, and Illinois.

4. Technical/Financial Assistance to Local Governments -- Connecticut, Utah, Colorado, Nevada, Missouri, Tennessee, Connecticut, California, New Hampshire, and probably many others, provide technical assistance (in the form of engineers or other experts who provide on-site guidance) and/or loans and grants to local governments to undertake energy conservation measures. Sometimes these are included with a larger program that also supports schools and state facilities, and sometimes these programs are exclusively designated for cities and counties.

California, for example, offers \$4 million in loans to help local governments save energy through small power production projects, public transportation systems, and other, more typical conservation measures. \$10 million in technical

assistance is available to help local governments identify and evaluate energy-saving opportunities.

Smaller, rural states, such as Nevada, have included a "circuit-rider" engineer who works closely with local government officials to develop, monitor, and revise their energy management programs. New Hampshire has awarded \$385,000 to 27 municipalities to install energy conservation measures in 64 buildings; these funds will be matched by nearly \$420,000 in local funds. The combined annual savings, however, are estimated at over \$420,000.

5. Technical/Financial Assistance to Small Businesses -- Small businesses offer many opportunities for savings. Because the economic health of these businesses can sometimes affect the livelihood of many citizens, many states have chosen to offer audit and financial assistance services.

Delaware, for example, provides free audits to small businesses, as do New Mexico, Massachusetts, Minnesota, and New York. Arkansas provides free audits and low-cost financing. Minnesota has a similar program that is co-sponsored by a participating utility. Florida funds two full-time energy specialists at two of the state's eight university-based small business development centers.

In Michigan, 285 people were recruited from local communities and trained to do walk-through energy audits of 6,400 small businesses. First year savings were estimated to be \$4.00 for each \$1.00 of federal/state funds contributed. Each of the auditors were paid an average of \$59 for each analysis they completed. Oregon established a business energy tax credit program, which has benefitted more than 1600 businesses and generated more than \$140 million in project investments. The annual energy savings currently exceed \$50 million.

In New Jersey, the Business Energy Improvement Program has developed a lighting grant program for small businesses in urban enterprise zones. The program grants up to \$15,000 per applicant to finance retrofits with a maximum five-year payback. Eligible improvements include timing devices, photocell controls, occupancy sensors, dimming systems, reflectors, and conversions from incandescent to high intensive discharge lamps.

Connecticut has provided \$380,000 to eight grantees under a non-profit industrial park and urban enterprise zone energy conservation program. The basic purposes it to assist small businesses located in older buildings. Maine instituted a loan subsidy program for commercial businesses whose primary heating source is fuel oil. In four months, the program expended \$526,523 in PVE funds, but managed to leverage \$1,670,801 in private funds for equipment retrofits.

6. Technical/Financial Assistance to Agriculture -- California has approved \$887,000 in low-interest loans, and awarded \$1.6 million for 32 grants to demon-

strate alternative energy-generating projects, energy-efficient tillage, water management, and various other energy-conservation techniques on the farm. In New Mexico, on-site audits of irrigation systems are conducted for farmers.

New Jersey has released more than \$913,000 in no-interest loans to family-owned farms, and individually owned or closely held businesses. Family-owned farm projects with average paybacks of approximately five years account for nearly \$800,000 of the loans issued to date.

Pennsylvania has recently developed a grant program to provide financial support for energy conservation in agribusiness. It will provide grants for up to 80 percent of the costs of an energy audit, and up to 50 percent of the costs for demonstration projects at farms and food processing plants.

Colorado has developed an extensive program for save energy and water through improved irrigation practices, including irrigation pump testing and conservation awards to farmers who save energy. Georgia has also looked at irrigation system improvements, and estimates that if the efficiency of such systems could be raised from 80.6 percent to 90 percent, the savings would approach \$2 million annually.

7. Performance Contracting -- Energy performance contracting (known variously as "shared savings," or "third-party financing") got off to a rocky start in several states, during the early years of the industry. Since then, and with revised tax laws that discouraged many of the less-capable firms, energy performance contracting is getting a better name, for it allows users to finance energy improvements that otherwise might not be able to undertake such projects. Because the costs of the improvements are "guaranteed" by the savings, there is no up-front cost to the user.

Illinois offers technical services to local governments and nonprofit institutions to encourage the use of savings-based performing contracting. Program participants are eligible to receive financial and technical assistance including: a comprehensive procurement process tailored to local purchasing requirements; engineering services to profile facilities and review the technical aspects of vendor proposals; proven evaluation process to review all aspects of the proposed project; and legal services to assist in contract review and negotiations. A total of 31 organizations applied for inclusion in the program, with utility costs in 1987 of over \$42 million.

Georgia, Colorado, Florida and Massachusetts have both entered into negotiations or have ongoing projects for performance-based financing of energy modifications in state buildings. Georgia has an extensive program of workshops, workbooks, and guidance to school districts, state agencies, and local governments interested in entering into such contracts. New York State has financed extensive pilot projects, workbooks, and evaluation tools for institutions interested in such

financing options.

8. Recycling -- Recycling programs seem to be sprouting up in my states, reflecting the favorable economics of recycling in recent years, and the relatively low costs in initiating such programs. Maryland seems to be a leader in this area, with extensive programs governing waste oil, waste paper, and recycling of auto and truck parts. Since 1977, the state has purchased 56,000 reams of recycled bond; purchases of recycling paper by state and local agencies have exceeded \$21.5 million, saving approximately 1.2 trillion Btu's, or enough fuel to heat about 10,000 homes for a year.

Missouri has assisted over 30 waste recycling centers with grants and feasibility studies, and helped to promote recycling at all 118 centers. A recent evaluation of its program indicated that 21.9 trillion Btu's were saved by recycling aluminum, glass, paper products, metal, oil, and plastic. Georgia has also decided to encourage waste oil recycling through a toll-free number giving collection sites, and Kansas recently established a pilot recycling program for the state Capitol Complex.

In New Hampshire, 73 cities and towns are participating in some form of recycling, and 83 more are in the process of implementing such programs; in all, these programs effect more than two-thirds of the cities and towns in the state. In Michigan, the Governor ordered a seven-point program for recycling waste oil, paper, and other materials, and directing state agencies to purchase recycled paper products. Wisconsin has recently awarded \$1.1 million in matching grants to seven businesses and 14 municipalities to implement recycling and waste-to-energy projects. West Virginia provides 20 one-time grants of up to \$10,000 to grantees to encourage recycling programs in government and nonprofit organizations.

9. Home Energy Rating Systems -- According to a recent report, there are thirty-four home energy rating and labeling systems throughout the country. These include state programs (Alaska, Arkansas, Colorado, Vermont, and others), local governments, and utilities. Although these various programs vary according to their sponsorship, marketing, technical complexity, and enforcement requirements, they all have in common a rating system by which a potential homebuyer can assess the relative energy efficiency of a home. This allows the buyer to evaluate energy costs along with the purchase price and other factors, when considering which home to buy.

Another common aspect of many HERS programs are the willingness of financial lending institutions to consider energy efficiency when determining whether or not to provide the loan; this may also include loans for energy retrofits that are included in the overall home mortgage.

The advantage of HERS programs is that they are relatively low-cost once

they become operational, and they can provide relatively easy ways for homeowners to improve the energy efficiency of homes; sometimes start-up can be time-consuming and difficult, particularly when lenders, real estate agents, and developers do not support such a program. However, action by Freddie Mac and Fannie Mae to approve HERS mortgages, as well as support for HERS in the Global Warming and Prevention Act of 1988 (HB 5460, sponsored by Rep. Caludine Schneider) and the "Energy Policy and Conservation Act (HB 5424 by Rep. Phil Sharp) suggest that the momentum for more HERS activities may be growing.

10. Percentage-of-income Plans (PIP) -- Rhode Island, Maine, Illinois, and several other states have developed percentage-of-income (PIP) plans, as an alternative to the traditional LIHEAP programs. Since these programs have been studied at some length by the LRC staff, we need not describe them further in this memo, except to say that a recent Illinois evaluation indicated that its statewide PIP program reduced the rate of disconnections to about 4 percent compared to 15 percent for non-participants. PIP programs have the disadvantage of being expensive, but PIP advocates believe that these costs are no greater than the current LIHEAP program and are offset by reduced energy usage by low-income families.

The National Consumer Law Center has been studying this issue quite thoroughly, and expects to have firm data on the costs, energy savings, and impact on low-income consumers in the near future.

11. Wastewater Treatment -- Virginia has audited 11 wastewater treatment plans and made recommendations for energy savings. Washington state provides a 20 percent rebate to local jurisdictions who purchase high efficiency motors to replace burned-out motors at water or wastewater facilities. This allows participating jurisdictions to buy longer lasting and more efficient motors at the price of a standard efficiency motor.

Arkansas, Georgia, Idaho, Pennsylvania, and several other states provide technical assistance, loans, and/or grants to municipalities to improve their municipal water system efficiency.

12. Transportation Management -- In addition to the carpool/vanpool matching programs, the car care clinics, and driver education programs -- which are popular in many states -- some states have taken transportation energy programs a step further. Maryland estimates savings of 77,697 gallons of motor fuel through its commuter alternatives program for employees of BWI airport. New Jersey developed a new computer software program for its 632 school districts to help school bus fleet fuel purchase, consumption, fleet maintenance, and efficiency.

North Carolina transports 700,000 children over 615,000 miles each day. To

reduce this cost, the state implemented a school bus routing and scheduling program, which provides 140 public school districts with school bus routes and school opening/closing schedules. The savings are conservatively estimated at \$1.2 million annually, making the payback period for system development costs approximately one year.

Sources

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Energy Exchange: The Newsletter for Weatherization Professionals, monthly newsletter, Syracuse, New York

The Energy Report, weekly newsletter, published by Pasha Publications, Arlington, Virginia

"Home Energy Rating News," Energy Rated Homes of America, Little Rock, Arkansas, Winter 88/89

"Low-Income Uses of Oil Overcharge Funds," National Consumer Law Center, Washington, D.C., July 20, 1989

Compendium of State Oil Overcharge Programs, private working documents of the Consumer Energy Council of America, Washington, D.C.

"State Energy Conservation Programs," DRAFT, National Association of State Energy Officials, Washington, D.C., May 28, 1989

Status Report #2: State Uses of Exxon and Stripper Well Oil Overcharge Funds, National Consumer Law Center, Washington, D.C. February 1989

APPENDIX F

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Berry, Linda; Hubbard, Marjie; and White, Dennis, "A Review of Financial Incentive, Low-Income, Elderly and Multifamily Residential Conservation Programs," Oak Ridge National Laboratory, September 1986.

Cabinet for Human Resources, Commonwealth of Kentucky, "Annual Plan: Weatherization Assistance Program for Low-Income Persons, FFY 88."

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